

## NEW AND LITTLE-KNOWN FISHES FROM THE PHILIPPINE ISLANDS.

BY HENRY W FOWLER.

During the past summer the writer had opportunity to study the collection of fishes in the Commercial Museums of Philadelphia, obtained some years previously from the Philippine Government. Dr. William P. Wilson, the Director of the Commercial Museums, very kindly offered every assistance in this work and through him a series of the duplicates, including the more important species of scientific interest, have been received into the collection of the Academy. Though the specimens are usually without detailed localities, most were probably obtained near Manila. Others were collected and shipped to Manila, so that no localities are here noted other than the islands as a whole. In some instances the native names were also preserved, although many have been lost prior to my examination.

The characteristic richness in species of the great East Indian fauna is at once apparent in even a cursory study of such a collection. Twenty-six species are described as new and figured. An imperfectly known rare cardinal-fish is redescribed.

***Scoliodon walbeehmii* (Bleeker).**

Four small examples, the largest about 305 mm. Mouth little longer than wide. Teeth entire or nearly so. Upper jaw with short labial fold. Anal fin length little less than its distance from ventrals. Outer pectoral angle nearly a right angle.

***Mobula eregoodoo-tenkee* (Cuvier).**

Young example with umbilical cord and egg-sac. Tail short, not half length of disk. Teeth numerous, little distinct. Cephalic fins curved inward, and front flange folds upward so tips well overlap. Last gill-openings each side wider than interspace. Small dorsal over ventral. Skin smooth. Color uniform pale brown, edges of cephalic fins darker. Eyes slaty. Disk length 254 mm., width much greater.

***Pisoodonophis cancrivorus* (Richardson).**

Günther gives coloration uniform, with more or less distinct blackish spot forward on dorsal. Bleeker quotes Richardson that the lateral line is not present and in the latter's figure it is so indicated.

My five examples all show it. Richardson's figure has a much smaller eye and has no pores behind the eye. Jordan and Richardson give the chin and throat pale yellow in life, and the pectoral yellowish; in my examples, muzzle and head below dusky or soiled blackish.

**Pisoodonophis boro** (B. Hamilton).

Several, with very fine longitudinal wrinkles or grooves, mostly parallel, on pharynx. Jordan and Richardson omit this species from their check-list, though Günther previously recorded an adult from Zebu.<sup>1</sup>

**Hemiramphus limbatus** Valenciennes.

Large series, all small, and with broken beaks. These show: Head  $4\frac{1}{5}$  to  $4\frac{1}{4}$ ; depth  $7\frac{2}{3}$  to  $8\frac{2}{3}$ ; D. II, 12 or 13; A. III, 12 or 13; scales 46 to 52 in lateral row to caudal base, and 6 to 9 more on latter; predorsal scales 42 to 47; snout  $2\frac{3}{4}$  to 3 in head measured from upper jaw tip; eye  $3\frac{2}{3}$  to  $4\frac{1}{5}$ ; maxillary 3 to  $3\frac{3}{5}$ ; interorbital  $3\frac{1}{2}$  to 4; rakers 5 to 7+10 to 17, lanceolate, about  $\frac{2}{3}$  of filaments and latter 2 in eye; length 80 to 118 mm.

Probably *Oxyporhamphus brevis* Seale belongs in *Arrhamphus* Günther (type *A. sclerolepis* Günther) or the short-billed forms with short pectorals.

**Mugil ruthveni** sp. nov. Fig. 1.

Head  $3\frac{2}{3}$ ; depth  $3\frac{2}{3}$ ; D. IV-I, 8; A. III, 8, 1; P. I, 14; V. I, 5; scales 30 in lateral series from gill-opening above to caudal base, and 3 more large ones on latter; 11 scales between second dorsal and anal origins; 20 predorsal scales; head width  $1\frac{1}{2}$  its length; head depth  $1\frac{2}{5}$ ; snout  $3\frac{4}{5}$ ; eye  $4\frac{1}{2}$ ; mouth width  $3\frac{2}{5}$ ; interorbital  $2\frac{2}{5}$ ; first dorsal spine  $1\frac{2}{5}$ ; first dorsal ray  $1\frac{4}{5}$ ; third anal spine  $2\frac{4}{5}$ ; first anal ray  $1\frac{2}{3}$ ; least depth of caudal peduncle  $2\frac{1}{5}$ ; pectoral  $1\frac{1}{3}$ ; ventral  $1\frac{1}{3}$ .

Body elongate, with fusiform contour, compressed, deepest at spinous dorsal origin. Caudal peduncle compressed, least depth about  $1\frac{1}{6}$  its length.

Head robust, somewhat constricted below, profiles alike. Snout moderately broad, convex as viewed above, length nearly half its

<sup>1</sup> The American species described by Goode and Bean and referred to *Pisoodonophis* is evidently different in its serpent-like head, strong neck-muscles and constriction of the head somewhat as in *Derichthys*. It may, therefore, stand as a distinct subgenus.

**Omochelys** subgen. nov.

Type *Pisoodonophis cruentifer* Goode and Bean.

Differs from subgenus *Pisoodonophis* in having the dorsal inserted behind the pectoral.

(Ὠμός, cruel; ἔγχελυς, eel; with reference to its savage habits.)

width. Eye circular, hind edge about half a pupil-diameter before center in head length. Adipose-eyelids well developed, posterior extends over last third of eye and anterior very narrow. Mouth slightly inferior, corner falls about opposite front nostril. Mandibular angle very broad, obtuse, symphysis forming little knob which fits in depression above. Teeth minute, uniserial in upper jaw, obsolete in mandible. Lips rather fleshy, upper jaw width about half of pupil. Inner buccal folds moderately broad, upper little broader. Tongue small, tip free, elongate. Maxillary exposed, not quite to eye. Lower preorbital edge straight, with minute denticles. Front nostril about last  $\frac{2}{5}$  in snout, simple pore with slight cutaneous rim. Hind nostril short vertical slit, little nearer front nostril than eye. Interorbital broadly convex.

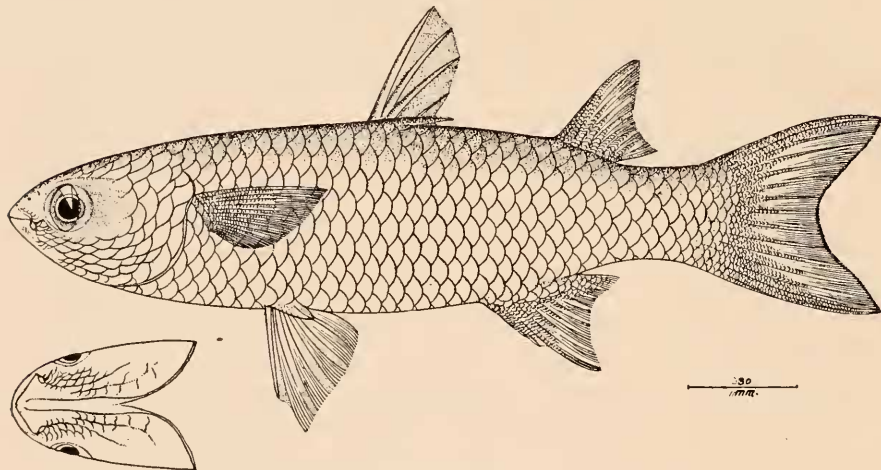


Fig. 1.—*Mugil ruthveni* sp. nov.

Gill-opening forward about midway in eye. Rakers about 30+46, slender, fine,  $2\frac{1}{4}$  in filaments and latter about equal eye. Pseudo-branchiae about half of gill-filaments. Isthmus narrowly constricted, smooth.

Scales large, in even longitudinal series. Head scaly, scales smaller below, and extends well forward on snout though not to its edge. Scaly pointed flap along spinous dorsal base  $1\frac{3}{5}$  in fin. Short scaly pectoral flap (damaged). Axillary ventral flap  $2\frac{3}{4}$  in fin. Broad scaly flap between ventral bases half of fin. Soft dorsal and anal scaly over basal halves. Caudal largely covered with small scales. Pectoral with small scales basally. Ventral scaly. Three scales between dorsal spine tips and soft dorsal origin.

Spinous dorsal inserted about midway between front of eye and caudal base, first spine longest and depressed fin  $1\frac{1}{3}$  to soft dorsal origin. Latter nearly an eye-diameter nearer caudal base than spinous dorsal origin, depressed fin  $1\frac{1}{4}$  to caudal base. Anal origin nearer caudal base than ventral origin, depressed fin  $1\frac{3}{5}$  to caudal base. Caudal emarginate behind,  $3\frac{1}{2}$  in head and trunk, lobes about equal. Pectoral short, broad,  $1\frac{1}{4}$  to spinous dorsal origin. Ventral inserted about opposite middle in depressed pectoral,  $1\frac{3}{4}$  to anal. Vent close before anal origin.

Color in alcohol dull brownish generally, slightly tinted olivaceous on back. Fins all pale, and hind caudal edge narrowly dusky. Iris pale slaty. Peritoneum blackish. No dark blotch at shoulder or pectoral base.

Length 240 mm.

Type, No. 47,478, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Only the type known. The dark hind caudal edge is suggestive of *Mugil sundanensis* Bleeker,<sup>2</sup> but that species has 9 branched anal rays, preorbital deeply notched, snout long as eye, etc.

(Named for Dr. Alexander G. Ruthven, of the University of Michigan, well known among leading herpetologists, who has written on Michigan fishes.)

**Mugil ogilbyi** sp. nov. Fig. 2.

Head  $3\frac{7}{8}$ ; depth  $3\frac{2}{3}$ ; D. IV-I, 8; A. III, 9; P. I, 14; V. I, 5; scales 28 in lateral series from gill-opening above to caudal base and 4 more large ones on latter; 10 scales between second dorsal and anal origins; 20 predorsal scales; head width  $1\frac{1}{2}$  its length; head depth  $1\frac{1}{2}$ ; snout  $3\frac{2}{3}$ ; eye  $4\frac{1}{2}$ ; mouth width  $3\frac{1}{5}$ ; interorbital  $2\frac{1}{4}$ ; first dorsal spine  $1\frac{1}{2}$ ; first dorsal ray  $1\frac{7}{8}$ ; third anal spine  $2\frac{3}{5}$ ; first anal ray  $1\frac{4}{5}$ ; least depth of caudal peduncle  $2\frac{1}{8}$ ; pectoral  $1\frac{1}{2}$ ; ventral  $1\frac{1}{2}$ .

Body elongate, contour fusiform with lower profile slightly more convex, deepest at spinous dorsal origin. Caudal peduncle compressed, least depth  $1\frac{1}{8}$  its length.

Head robust, very slightly constricted below, lower profile slightly more convex and inclined. Snout broad, widely convex as viewed above, length about  $\frac{2}{3}$  its width. Eye circular, hind edge anterior to center in head length about diameter of pupil. Adipose-eyelids

<sup>2</sup> Nat. Tijds. Ned. Indie, IV, 1853, p. 265. Benculen-Sumatra. Batavia, Java.

Günther, Cat. Fish. Brit. Mus., III, 1861, p. 425 (copied).



little developed, posterior extends over last fifth of eye and anterior very narrow. Mouth little inferior, and corner falls opposite front nostril. Mandibular angle very broad, obtuse, symphysis forming little knob which fits in depression above. Teeth very minute, uniserial in upper jaw, apparently absent in lower. Lips rather fleshy, width of upper about  $\frac{1}{4}$  of pupil. Inner buccal folds moderately broad, upper little broader. Tongue small, tip free, elongate. Maxillary exposed, about to eye. Lower preorbital edge slightly curved, with few very minute obsolete denticles. Front nostril about last  $\frac{2}{3}$  in snout, simple pore with slight cutaneous rim. Hind nostril short vertical slit, little nearer front nostril than eye. Interorbital broadly convex.

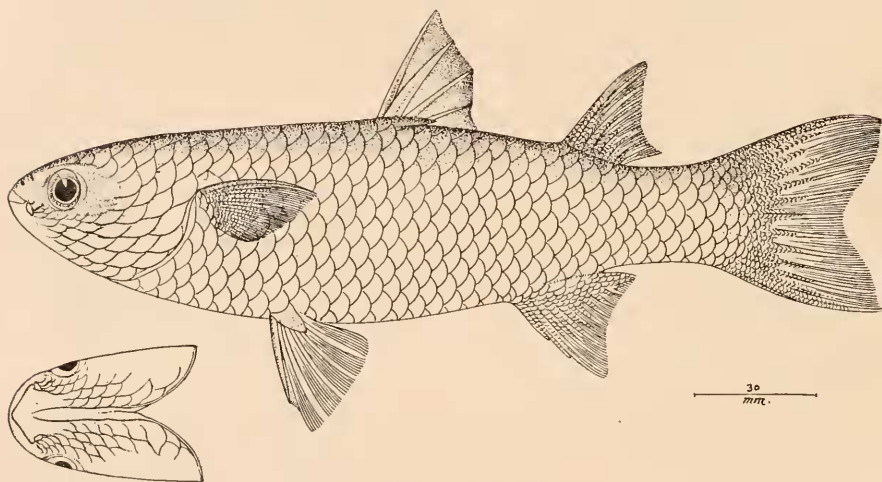


Fig. 2.—*Mugil ogilbyi* sp. nov.

Gill-opening forward about opposite front pupil edge. Rakers about 35+52, slender, fine,  $2\frac{1}{8}$  in filaments and latter  $1\frac{1}{8}$  in eye. Pseudobranchiæ about  $1\frac{1}{2}$  in gill-filaments. Isthmus narrow, constricted, with median groove.

Scales large, in even lengthwise series. Head scaly, scales smaller below, and extend well forward on snout, though not to its edge. Scaly pointed flap along spinous dorsal base half depressed fin length. Scaly flap in pectoral axil  $\frac{1}{3}$  of fin. Axillary ventral scaly flap  $2\frac{1}{2}$  in fin. Broad scaly flap between ventral bases 2 in fin. Soft dorsal and anal scaly over basal halves. Caudal largely scaly, fewer scales about pectoral basally. Ventral with many small scales. Four scales between dorsal spine tips and soft dorsal origin.

Spinous dorsal inserted midway between hind nostril and caudal base, first spine very slightly longer than second, depressed fin  $1\frac{1}{2}$  to soft dorsal origin. Last slightly nearer caudal base than spinous dorsal origin, depressed fin  $1\frac{1}{3}$  to caudal base. Anal origin little nearer caudal base than ventral origin, depressed fin  $1\frac{3}{4}$  to caudal base. Caudal emarginate behind, about equals head in length, lobes about equal. Pectoral short, broad,  $1\frac{1}{2}$  to spinous dorsal. Ventral inserted near last third of depressed pectoral, reaches half way to anal. Vent close before anal origin.

Color in alcohol dull brownish generally, upper surface tinged with olivaceous. Pockets of fallen scales exposed with more or less dusky. Traces of darker lengthwise streaks, one to each row of scales along back. Dorsals and caudal tinted with pale dusky, though hind edge of latter not dark. Pectoral brownish and other fins pale. Iris pale slaty. Peritoneum blackish. No dark shoulder spot or at pectoral base.

Length 210 mm.

Type, 47,479, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also No. 47,480, paratype, same data. Head  $3\frac{7}{8}$ ; depth  $3\frac{2}{5}$ ; D. IV-I, 8; A. III, 9, 1; scales 29 in lateral series from gill-opening above to caudal base; 11 scales between second dorsal and anal origins; 20 predorsal scales; snout  $3\frac{2}{3}$  in head; eye  $4\frac{1}{8}$ ; mouth width  $3\frac{1}{3}$ ; inter-orbital  $2\frac{1}{5}$ ; length 205 mm.

This species is closely allied with *Mugil alcocki* Ogilby,<sup>3</sup> but differs in the larger head, deeper body, longer snout, etc. Günther does not give the length of the first dorsal spine, though Ogilby remarks "it is noteworthy that neither Cantor or Bleeker have recorded any mullet having the first dorsal spine prolonged, from any part of the Malay Peninsula and Archipelago."

(Named for Mr. J. Douglas Ogilby, the accomplished Australian Ichthyologist of the Queensland Museum.)

*Mugil philippinus* sp. nov. Fig. 3.

Head  $3\frac{4}{5}$ ; depth  $3\frac{4}{5}$ ; D. IV-I, 8; A. III, 8; P. 1, 13; V. I, 5; scales 30 in lateral series from gill-opening above to caudal base and 3 more large ones on latter; 10 scales between second dorsal and anal origins; 19 predorsal scales; head width  $1\frac{1}{2}$  in its length; head depth  $1\frac{2}{5}$ ;

<sup>3</sup> Ann. Queensland Mus., No. 9, 1908, pp. 21-2. Based on *Mugil subviridis* Day (non Valenciennes).

—Günther, Cat. Fish. Brit. Mus., III, 1861, p. 423, fig. (head below). Madras.

snout 4; eye 4; mouth width  $3\frac{2}{5}$ ; interorbital  $2\frac{2}{7}$ ; first dorsal spine  $1\frac{3}{5}$ ; first dorsal ray  $1\frac{7}{8}$ ; third anal spine 3; first anal ray  $1\frac{7}{8}$ ; least depth of caudal peduncle  $2\frac{1}{4}$ ; pectoral  $1\frac{2}{5}$ ; ventral  $1\frac{2}{5}$ .

Body elongate, with fusiform contour, compressed, deepest at spinous dorsal origin. Caudal peduncle compressed, least depth about  $1\frac{1}{4}$  its length.

Head robust, somewhat constricted below, profiles alike. Snout broad, widely convex as viewed above, length about  $\frac{3}{5}$  its width. Eye circular, hind edge little anterior to center in head length. Adipose-eyelids well developed, posterior extends over last third of eye and anterior about half so wide. Mouth little inferior, corner falls very slightly behind front nostril. Mandibular angle very

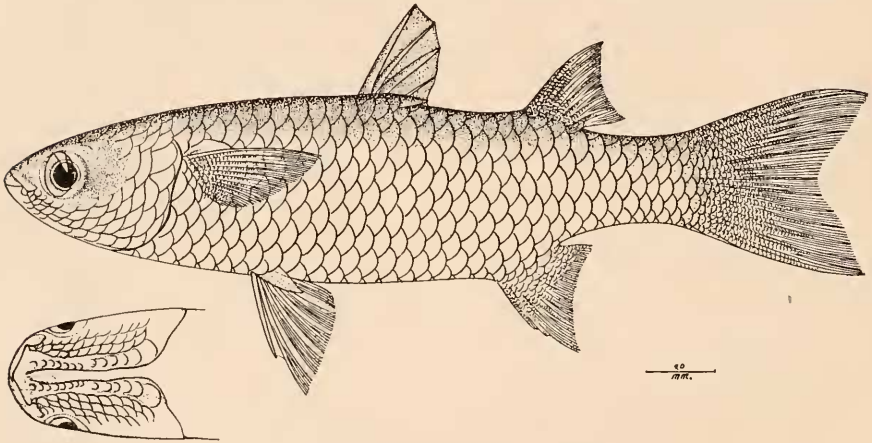


Fig. 3.—*Mugil philippinus* sp. nov.

broad, obtuse, symphysis forming little knob which fits in depression above. Teeth very minute, uniserial in upper jaw, and obsolete in mandible. Lips rather fleshy, width of upper about  $\frac{2}{3}$  of pupil. Inner buccal folds moderately broad, upper little wider. Tongue small, tip free, elongate. Maxillary exposed, about reaches eye. Lower preorbital edge not notched, with a few obsolete denticles. Front nostril about last third in snout, simple pore with slight cutaneous rim. Hind nostril short vertical slit midway between front nostril and front eye edge. Interorbital broadly convex.

Gill-opening forward about opposite hind pupil edge. Rakers about 38+48, slender, fine,  $2\frac{1}{2}$  in filaments and latter equal eye. Pseudobranchiae about  $1\frac{2}{3}$  in gill-filaments. Isthmus narrow, with slight depression.

Scales large, in even longitudinal series. Head scaly, scales smaller below and extend well forward on snout, though not to its edge. Scaly pointed flap along spinous dorsal base about  $1\frac{3}{4}$  of first spine length. Scaly flap in pectoral axil about  $3\frac{1}{5}$  in fin. Axillary ventral scaly flap about  $2\frac{2}{3}$  in fin. Broad scaly flap between ventral bases  $2\frac{2}{5}$  in fin. Soft dorsal and anal scaly over basal halves. Caudal largely covered with small scales from base, pectoral likewise. Three scales between dorsal spine tips and soft dorsal origin.

Spinous dorsal inserted about midway between eye front and caudal base, first spine about as long as second, depressed fin  $1\frac{1}{3}$  to soft dorsal origin. Last about midway between first dorsal origin and caudal base, depressed fin  $1\frac{2}{5}$  to caudal base. Anal origin slightly nearer caudal base than ventral origin, depressed fin  $1\frac{1}{2}$  to caudal base. Caudal emarginate behind,  $3\frac{2}{3}$  in head and trunk, lower lobe slightly longer. Pectoral short, broad,  $1\frac{1}{3}$  to spinous dorsal. Ventral inserted about opposite last fourth of depressed pectoral,  $1\frac{4}{5}$  to anal. Vent close before anal origin.

Color in alcohol dull brownish generally, back and upper surfaces with dull olive shades, belly and below paler. Dorsals and caudal tinted with pale dusky. Iris pale slaty. Fins whitish. Peritoneum blackish.

Length 237 mm.

Type, No. 47,481, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also No. 47,482, paratype, same data. Head  $3\frac{4}{5}$ ; depth  $3\frac{3}{4}$ ; D. IV-I, 8; A. III, 8; scales 30 in lateral series from gill-opening above to caudal base; 11 scales between second dorsal and anal origins; 19 predorsal scales; snout  $3\frac{1}{5}$  in head; eye  $4\frac{1}{3}$ ; mouth width  $3\frac{1}{5}$ ; interorbital  $2\frac{2}{5}$ ; length 254 mm. This example figure 3.

Differs from *M. ogilbyi* in the fewer (3) scales after depressed spinous dorsal, slightly larger body scales and first dorsal spine not longer than the second.

**Mugil lepidopterus** sp. nov. Fig. 4.

Head 4; depth  $3\frac{3}{5}$ ; D. IV-I, 8; A. III, 9; P. 1, 12; V. 1, 5; scales 30 in lateral series from gill-opening above to caudal base and 3 more large ones on latter; 10 scales between second dorsal and anal origins; 20 predorsal scales; head width  $1\frac{2}{5}$  its length; head depth  $1\frac{2}{5}$ ; snout  $3\frac{1}{2}$ ; eye 4; mouth width 3; interorbital  $2\frac{1}{6}$ ; first dorsal spine  $1\frac{2}{5}$ ; first dorsal ray  $1\frac{2}{3}$ ; third anal spine  $2\frac{1}{2}$ ; first anal ray  $1\frac{3}{5}$ ; least depth of caudal peduncle 2; pectoral  $1\frac{1}{3}$ ; ventral  $1\frac{1}{3}$ .

Body moderately elongate, contour fusiform, compressed, deepest at spinous dorsal origin. Caudal peduncle compressed, least depth  $1\frac{1}{6}$  its length.

Head moderately robust, somewhat constricted below, profiles alike. Snout broad, convex as viewed above, length nearly half its width. Eye nearly impinging on upper profile, little advanced before center in head length. Adipose-eyelids well developed, posterior extends over last third of eye and anterior very narrow. Mouth slightly inferior, and corner falls about opposite front nostril. Mandibular angle very broad, obtuse, symphysis forming little knob fitting in depression above. Teeth very minute, feeble and uniserial in upper jaw, apparently absent in lower jaw. Lips little fleshy,

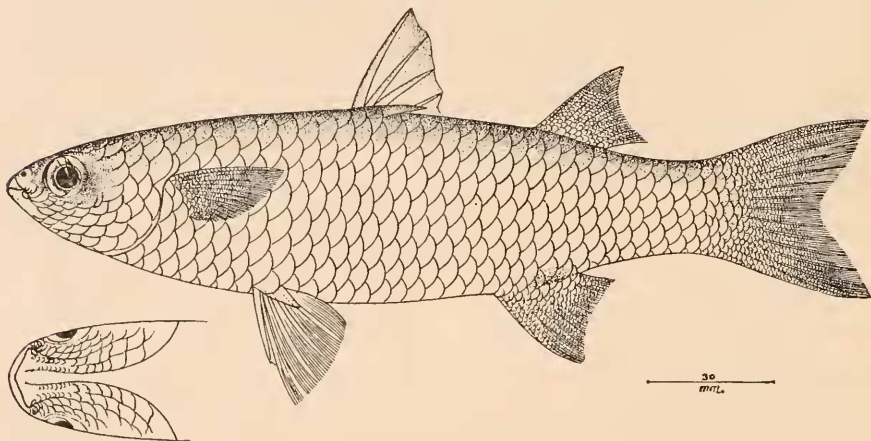


Fig. 4.—*Mugil lepidopterus* sp. nov.

upper jaw width about half of pupil. Inner buccal folds rather narrow. Tongue small, tip free, elongate. Maxillary exposed, reaches eye. Lower preorbital edge slightly convex and finely denticulate. Front nostril about last  $\frac{2}{5}$  in snout, simple pore with slight cutaneous rim. Hind nostril short vertical slit, over and little nearer front nostril than eye. Interorbital broadly and slightly convex, depressed medially.

Gill-opening forward nearly opposite front pupil rim. Rakers about 30+48, slender or finely lanceolate, 3 in filaments and latter about equal eye. Pseudobranchiæ about half of gill-filaments. Isthmus narrowly constricted, with median groove forward.

Scales large, in even longitudinal series, mostly uniform. Head scaly, smaller scales below, extend forward on snout though not



quite to its edge. Scaly pointed flap along spinous dorsal base  $1\frac{1}{2}$  in fin. Short scaly axillary pectoral flap 4 in fin. Axillary scaly ventral flap  $2\frac{1}{3}$  in fin. Broad scaly flap between ventral bases (damaged). Soft dorsal, anal and caudal all densely scaled, only hind edge of last naked. Pectoral and ventral largely scaly over basal portions. Three scales between dorsal spine tips and soft dorsal origin.

Spinous dorsal midway between snout tip and caudal base, first and second spines subequal, fin  $1\frac{1}{2}$  to soft dorsal origin. Latter nearly midway between spinous dorsal origin and caudal base, depressed fin  $1\frac{1}{3}$  to caudal base. Anal origin much nearer caudal base than ventral origin, depressed fin  $1\frac{2}{3}$  to caudal base. Caudal well emarginate behind, about long as head, lobes about equal. Pectoral short, broad,  $1\frac{2}{3}$  to spinous dorsal origin. Ventral inserted about opposite last fourth in pectoral, extends slightly over half way to anal. Vent a scale width before anal.

Color in alcohol faded, dull, uniform brown, slightly olive above. Dorsals slightly dusky above, and same tint very slight along hind caudal edge. Iris dull slaty. Peritoneum black. No dark blotch at shoulder or pectoral base.

Length 206 mm.

Type, No. 47,483, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

This species is allied with *Mugil dussumieri* Valenciennes<sup>4</sup> in its densely scaled soft dorsal and anal fins. As described by Day<sup>5</sup> *M. dussumieri* would differ in the bent and emarginate preorbital, spinous dorsal origin midway between front eye edge and caudal base, and first spine longest and strongest. Day's fish is also slightly more slender than my example.

(Δεπίς, scale; πτερὸν, fin; with reference to the scaly rayed vertical fins.)

*Corythoichthys matterni* sp. nov. Fig. 5.

Head  $3\frac{1}{4}$  to vent; depth  $7\frac{1}{8}$ ; D. 25; A. 2; P. 15; C. 6; rings 15+39; snout  $2\frac{1}{6}$  in head; eye  $5\frac{1}{2}$ ; pectoral  $5\frac{1}{2}$ ; caudal  $1\frac{1}{2}$  in snout; inter-orbital  $2\frac{1}{2}$  in eye.

Body very long, trunk well compressed and deepest midway in its length, and combined with head  $1\frac{9}{10}$  in long slender tapering tail. Upper keel each side on back not extending beyond last fourth of

<sup>4</sup> Hist. Nat. Poiss., XI, 1836, p. 109. Bombay, Coromandel.

<sup>5</sup> Fishes of India, II, 1876, p. 352 (non Pl. 74, fig. 4).

dorsal. This replaced by similar parallel keel beginning little below opposite dorsal origin and continued to end of tail. Median lateral keel from pectoral axil, slopes down behind close to lower body keel, and ends opposite beginning of hind section of upper keel along back. Median keel on belly complete from breast to vent. Lower keel along each side of body from head to caudal base, and not interrupted.

Head short, compressed, and upper profile concave. Snout little longer than postocular region, profile concave. Eye circular, rather small, supraorbital keel moderate. Mouth terminally superior, small. Maxillary short, about half of eye. Interorbital concave. Opercle with well-developed horizontal keel, and fine striæ radiate above and below. Slight median keel on snout above occiput, and then continued back obsoletely to dorsal, each one being broken at segment junctures.

Gill-opening small superior oblique slit about its own length above pectoral origin,  $1\frac{1}{2}$  in eye.



Fig. 5.—*Corythoichthys materni* sp. nov.

Rings all firm, and keels without spines. Each ring with numerous transverse striæ.

Dorsal origin slightly behind vent and beginning of second section of upper lateral keel, and extends over 6 abdominal rings. Anal very small, about long as pupil, insertion near last third of ring before dorsal origin. Caudal small, oblong, median rays longest. Pectoral broad basally, long as eye.

Color faded dull brownish in alcohol, ground-color uniform, speckled and finely dotted minutely and irregularly with deeper or darker brown to burnt umber. Side of head with brownish dots and bars, especially on opercle below. Eye crossed by several deep brown radiating bars. Broad deep brown streak from eye along side of snout. From behind each eye obliquely down below deep brown bar, but not united on lower surface of head. Fins all plain and unmarked. Iris pale slaty.

Length 138 mm.

Type, No. 47,484, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

This species differs from the preceding chiefly in its greatly elongated tail and shorter snout. Of the various synonyms located with *C. spicifer* some approach the present species. Perhaps *Syngnathus biserialis* Kaup<sup>6</sup> is closer, it having D. 26 or 27, rings 16+46 and a much shorter tail. The Indian *Microphis tenuis* Blyth<sup>7</sup> is equally with long tail as my example, snout half the head, D. 24? and rings 16+36.

(For Mr. Edwin S. Mattern of Allentown, Pa., who collected many local fishes for the Academy.)

***Doryichthys philippinus* sp. nov.** Fig. 6.

Head  $3\frac{1}{10}$  to vent; depth  $14\frac{1}{6}$ ; D. 40; A. 5; P. 21; C. 5; rings 21+24; snout  $1\frac{2}{3}$  in head; eye  $8\frac{1}{5}$ ; pectoral  $8\frac{1}{2}$ ; caudal  $5\frac{1}{2}$ ; interorbital  $1\frac{1}{8}$  in eye.

Body very long, especially greatly elongated trunk which broad as deep, and deepest midway in its length, tail  $1\frac{5}{6}$  in combined head and trunk. Tail tapers moderately, and not especially slender at caudal base. Upper keel along each side of back to about last

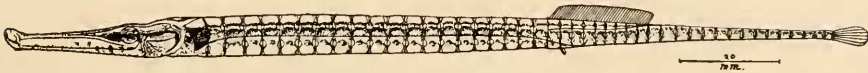


Fig. 6.—*Doryichthys philippinus* sp. nov.

fifth of dorsal. This replaced by similar parallel keel beginning little below about opposite dorsal origin and continued to end of tail. Median lateral keel from pectoral axil, slopes down to lower body edge extent of first three keels along dorsal base and continuous then to caudal base. Median keel on belly complete from breast to vent. Lower keel along each side of body from head to vent, when slightly approximate over first two abdominal keels, then give place to lateral keels.

Head elongate, well compressed, and profiles largely alike. Snout little over twice length of postocular region, profile sloping up behind. Eye circular, moderate, center at last third in head. Mouth terminally superior, small. Maxillary short, about  $1\frac{2}{5}$  in eye, expansion equals pupil. Interorbital slightly concave. Well-developed median keel along snout edge above and one each side which extend to middle of interorbital. Occiput and first 2 rings with median keel. Opercle with well-developed horizontal keel, and from its front end 4 less distinct keels radiate obliquely down and back. Opercle and side of rostrum with fine flutings, reticulate and variable.

<sup>6</sup> Cat. Lophobr. Fish., 1856, p. 33.

<sup>7</sup> Journ. Asiat. Soc. Bengal, 1858, p. 272.

Gill-opening small, horizontal, well elevated and little before pectoral origin, about long as pupil.

Rings all firm, and keels each minutely serrate, each ending in slight spine at sutures. Surface of each keel with many fine vertical striae.

Dorsal origin about opposite vent or about opposite beginning of second section of upper lateral keel, and base extends over 9 abdominal rings. Anal small, length about half of eye, and its insertion on first abdominal ring slightly behind dorsal origin. Caudal small, oblong, median ray longest. Pectoral very broad basally, so its base equals eye-diameter, and length slightly less than its base.

Color in alcohol rather dull brown generally, sides and belly minutely dusted or speckled with dark brownish. From side of snout end to eye deep brown streak, then this as well defined dark brown line over postocular region, on side of back to caudal. Also on sides below this dark line various dusky mottlings, most distinct on trunk rings. Iris pale slaty. Fins largely colorless.

Length 173 mm.

Type, No. 47,485, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Allied with *Microphis pleurostictus* Peters, *M. caudatus* Peters and *M. jagorii* Peters, all from the Philippines, but differs at once in the much longer snout.

*Scomberoides tala* (Cuvier).

Five examples. *Eleira* Jordan and Seale, based on the present species, does not appear really of generic rank. It is characterized by the diverging front canine each side of the lower jaw tip. My examples show this most pronounced in the young, and the teeth gradually erect and inconspicuous with age. Young also without black apical dorsal blotch. *S. moadetta* has enlarged front canines, besides the black apical dorsal blotch.

**SELAR** Bleeker.

*Selar* Bleeker, Nat. Tijds. Ned. Indie, I, 1850, pp. 343, 352, 353. Type *Caranx boops* Cuvier, first species.

*Trachurops* Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 431. Type *Scomber crumenophthalmus* Bloch, monotypic.

The type of *Selar* has not been formally designated, so the above may be adopted. *Trachurops* is thus superseded, as its type species like that of *Selar*, has a deep cross-furrow at the shoulder-girdle at

its juncture with the isthmus, also a small fleshy knob above the furrow.

Jordan and Starks recently contend<sup>8</sup> the use of *Selar* for the *Caranx kalla*, *C. ire* and *C. affinis* group.

**Selar boops** (Cuvier).

Four adults.

**Selar crumenophthalmus** (Bloch).

Several examples.

**Leiognathus philippinus** sp. nov. Fig. 7.

Head 3; depth  $2\frac{1}{8}$ ; D. III, 16; A. III, 14; P. II, 15; V. I, 5; tubes 55 in lateral line to caudal base; about 13 scales in vertical series between spinous dorsal origin and lateral line; about 20? scales in

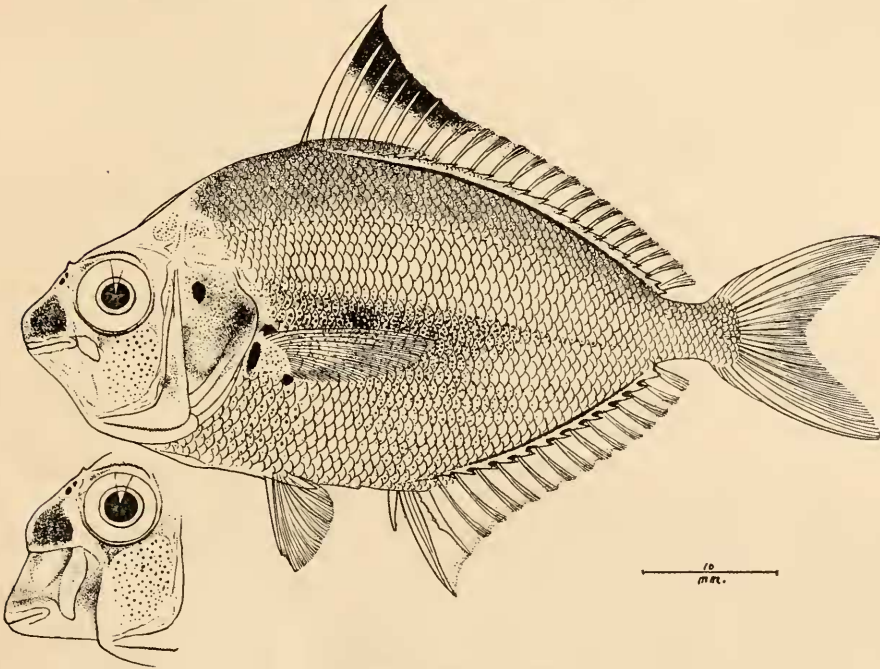


Fig. 7.—*Leiognathus philippinus* sp. nov.

vertical series between spinous anal origin and lateral line; head width  $1\frac{7}{8}$  its length; head depth at occiput 1; second dorsal spine  $1\frac{2}{5}$ ; first dorsal ray 3; second anal spine  $1\frac{7}{8}$ ; first anal ray  $2\frac{3}{4}$ ; upper caudal lobe  $1\frac{1}{5}$ ; pectoral  $1\frac{1}{4}$ ; ventral 2; snout  $3\frac{4}{5}$ ; eye  $2\frac{2}{3}$ ; maxillary  $2\frac{2}{3}$ ; interorbital  $3\frac{1}{4}$ ; least depth of caudal peduncle  $4\frac{1}{5}$ .

<sup>8</sup> Ann. Carnegie Mus., XI, 1917, p. 443.



Body rather elongate, compressed, deepest near middle or origin of spinous anal, and upper profile little more convex anteriorly than lower. Caudal peduncle compressed, least depth  $1\frac{2}{3}$  its length.

Head rather deep, compressed, profiles similarly inclined. Snout obtuse, convex over surface, protrudes little beyond lower jaw, long as wide. Eye large, close to upper profile, hind pupil edge midway in head length. Mouth small, with short gape horizontal about half way to eye. Lips thin, narrow. Profile of mandible slightly concave to articulation below, which about opposite front pupil edge. Mouth protractile downward. Teeth fine, small, weak, uniform, brush-like, single row in each jaw. No teeth on mouth roof or tongue. Inner buccal folds rather narrow. Tongue thick fleshy, not distinct. Maxillary hangs down from preorbital about  $\frac{2}{5}$  eye-diameter below eye, its expansion 3 in eye. Nostrils together, close before eye about level with upper pupil edge. Interorbital concave. Two short sharp-pointed spines above nostrils. Supraocular ridge finely serrated. Lower preopercle edge well serrated, and serræ largest behind, hind edge entire. Supraocular spine almost meets that of predorsal process.

Gill-opening extends forward about opposite hind pupil edge. Rakers  $6+19$ , lanceolate, trifle less than filaments, which about  $2\frac{2}{5}$  in eye. Pseudobranchiæ little longer than gill-filaments. Shoulder-girdle edge within gill-opening with 2 firm low processes, upper trifle above and lower trifle below, pectoral base. Isthmus width  $2\frac{1}{2}$  in eye, membranes broadly joined.

Scales small, narrowly imbricated, caducous, and extend forward on chest. Well-developed scaly sheaths along bases of spinous dorsal and anal. Soft dorsal and anal with a series of inconspicuous spines each side basally, fin ray between each pair, and all directed evenly backward. Axillary scaly ventral flap  $\frac{3}{4}$  length of spine. Caudal base scaly. Abdomen narrowly compressed, lower face of preanal spine with median groove, spine to vent or midway in space between ventral and anal origins. Short median groove on process of chest. Two small keels extend forward from ventral bases, converge slightly in front. Lateral line convex most its course, reaches caudal base, though with scale interrupted here and there behind. Pores in lateral line simple, each well exposed, and form nearly continuous series.

Spinous dorsal inserted slightly behind pectoral origin, second spine longest, and others graduated down behind to uniformly low soft dorsal. Spinous anal inserted trifle nearer caudal base than

snout tip, first spine about 3 in second, and third about  $\frac{4}{5}$ . Soft anal like soft dorsal. Caudal well forked, pointed lobes about equal. Pectoral pointed, reaches soft anal origin. Ventral inserted below pectoral origin, fin  $\frac{4}{5}$  to anal and spine  $\frac{3}{4}$  of fin. Front basal edges of third dorsal and anal spines finely serrated.

Color in alcohol largely pale brownish. Pale diffuse streak from shoulder to caudal base. Below this and on sides of head many dusky dots, crowded at first but becoming sparse below. Along back, close to dorsal base, dusky line. Along anal basally dusky blotch between each basal spine. Near hind opercle edge blackish short line above and another below. Also shorter bar or blotch above pectoral base and another below, axil with dark brown dots. Opercle shaded dusky, also inside of gill-opening. Chest and cheek with dusky dots like on trunk below. Side of snout dusky-brown. Iris slaty-gray. Black blotch on outer portions of second to fifth spinous dorsal membranes.

Length 65 mm.

Type, No. 47,486, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also Nos. 47,487 to 47,490, same data, paratypes. These show: Head  $3\frac{1}{8}$  to  $3\frac{1}{4}$ ; depth  $2\frac{1}{8}$ ; D. VIII, 16; A. III, 13 or 14; snout  $3\frac{1}{5}$  to  $3\frac{1}{2}$  in head; eye  $2\frac{7}{8}$  to 3; maxillary  $2\frac{1}{4}$  to  $2\frac{3}{4}$ ; interorbital  $2\frac{3}{4}$  to  $3\frac{1}{8}$ ; length 63 to 68 mm.

Easily distinguished from *L. splendens* by its colors. Falls within *Eubleekeria*.

AURIGEUULA subgen. nov.

Type *Clupea fasciata* Lacépède.

Breast and lower part of belly naked. Lateral line complete. Second dorsal spine twice or more length of third, conspicuously produced. Second anal spine also elongate.

Characterized chiefly by its elongated second dorsal and anal spines.

(*Auriga*, coachman; *Equula* an old name for *Leiognathus*; with reference to the long whip-like dorsal and anal spines.)

*Leiognathus fasciatus* (Lacépède).

One example.

*Amia melas* sp. nov. Fig. 8.

Head  $2\frac{2}{5}$ ; depth  $2\frac{2}{3}$ ; D. VII-I, 9; A. II, 8; P. II, 12; V. I, 5; scales about 21? (according to pockets) in median lateral series from

shoulder to caudal base and possibly 4 more on latter; apparently 2 ? scales above l.l. to spinous dorsal origin and 6? in vertical series below to spinous anal origin; 3 predorsal scales; head width  $2\frac{1}{8}$  in its length; head depth at occiput  $1\frac{1}{4}$ ; mandible  $1\frac{5}{6}$ ; fourth dorsal spine 2; second anal spine 2; second dorsal ray  $1\frac{1}{3}$ ; fourth anal ray  $1\frac{2}{3}$ ; least depth of caudal peduncle  $2\frac{3}{5}$ ; caudal  $1\frac{2}{5}$ ; pectoral  $1\frac{2}{3}$ ; ventral  $1\frac{1}{2}$ ; snout  $3\frac{1}{2}$  in head measured from upper jaw tip; eye  $2\frac{2}{3}$ ; maxillary  $2\frac{1}{5}$ ; interorbital  $3\frac{1}{2}$ .

Body well compressed, deep, back moderately elevated, deepest at spinous dorsal origin, slight median predorsal keel and other

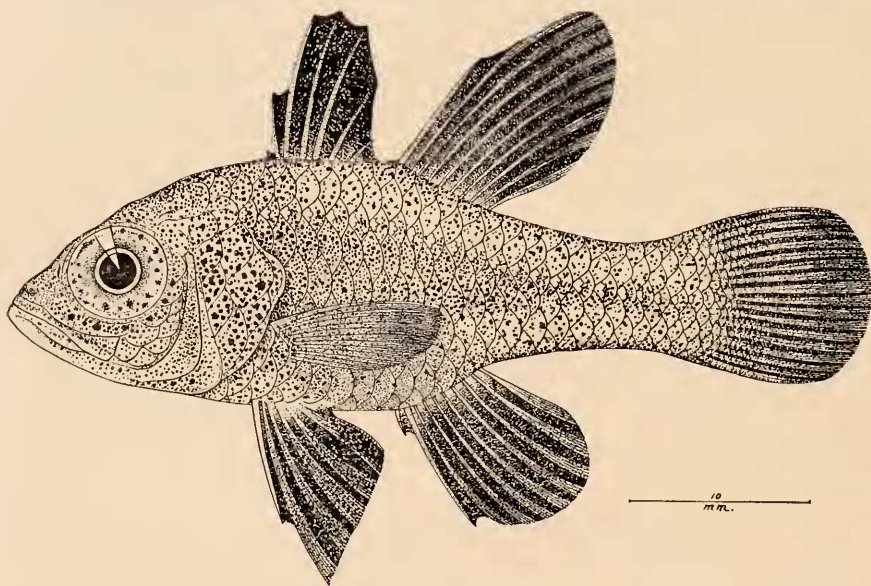


Fig. 8.—*Amia melas* sp. nov.

edges rounded convexly. Caudal peduncle well compressed, least depth about  $1\frac{1}{2}$  its length.

Head large, deep, well compressed, flattened sides nearly evenly sloping above and below, and upper profile little more steep than lower. Snout short, surface convex, though profile little concave, and length  $\frac{2}{3}$  its width. Eye very large, rounded, impinging on upper profile slightly, and center in head length near hind pupil edge. Mouth large, oblique, and closed lower jaw slightly protruding. Maxillary large, oblique, entirely along upper edge slipping below narrow preorbital, and reaches to pupil center. Terminal maxillary expansion  $2\frac{1}{2}$  in eye, hind edge little emarginate. Preorbital width

about 4 in eye. Lips little developed, narrow, firm. Teeth fine, even, short, in moderately wide bands in jaws. Narrow band of similar teeth over vomer to each palatine. Tongue free, depressed, smooth, rounded in front. Front nostril simple pore nearly midway in snout length and hind nostril little larger, close before front eye edge. Interorbital with slight furrow each side in front, slightly convex behind. Preopercle ridge entire, and hind edge minutely serrate. Opercle with 2 small spines along hind edge.

Gill-opening extends forward about opposite front pupil edge. Rakers iv, 1+10, iv, lanceolate, slender, twice length of filaments or 2 in eye. Pseudobranchiæ long as gill-filaments. Isthmus long, constricted forwards, and with deep trenchant keel over greater portion anteriorly.

Scales large, at present mostly fallen, finely ctenoid, and apparently in lengthwise rows. Head scaly, and evidently 2 rows of large scales on cheek. Occiput with number of mucous channels. Apparently scaly flap between ventral bases. At present no axillary ventral scale. Caudal base scaly, otherwise fins naked. Lateral line apparently complete, and largely concurrent with dorsal profile. Tubes? Suprascapula entire.

Spinous dorsal inserted about opposite pectoral origin, fourth spine longest though little longer than third or fifth, second and sixth subequal, and first much shorter than seventh. Soft dorsal inserted about midway between eye centre and caudal base, second ray highest, and depressed fin  $1\frac{1}{6}$  to caudal base. Spinous anal inserted opposite soft dorsal origin, first spine about 5 in second. Soft anal like soft dorsal, though much lower,  $1\frac{1}{4}$  to caudal base. Caudal (damaged) apparently rounded. Pectoral moderate, reaches about opposite last basal fourth of soft dorsal. Ventral origin slightly before pectoral origin, fin reaches soft anal origin and ventral spine but little short of spinous anal origin. Vent about opposite last seventh of depressed ventral spine.

Color in alcohol rather dark chocolate-brown generally, pockets of fallen scales deeper brownish. Except pectorals all fins blackish-brown, very dark and without spots or markings. Pectoral pale brown. Muzzle and mandible slightly paler than rest of head. Iris dull slaty.

Length 55 mm.

Type, No. 47,491, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.



Allied with *Apogon nigricans* Day,<sup>9</sup> but differs in the much lower anal, pectoral with pale base, and apparently without traces of the dark vertical bars.

(Μηλας, black.)

*Amia sealei* sp. nov. Fig. 9.

Head  $2\frac{2}{5}$ ; depth  $2\frac{3}{4}$ ; D. VII-I, 9; A. II, 8; P. II, 12; V. I, 5; scales 22 in lateral line to caudal base and 4 more on latter; 2 scales above l.l. to spinous dorsal origin, and 6 in vertical series below to spinous anal origin; 4 predorsal scales; head width  $2\frac{1}{5}$  in its length; head depth at occiput  $1\frac{2}{5}$ ; snout  $4\frac{1}{5}$ ; eye  $2\frac{7}{8}$ ; maxillary  $2\frac{1}{6}$ ; interorbital 5; third dorsal spine  $2\frac{1}{6}$ ; second anal spine 3; second dorsal ray  $1\frac{4}{5}$ ;

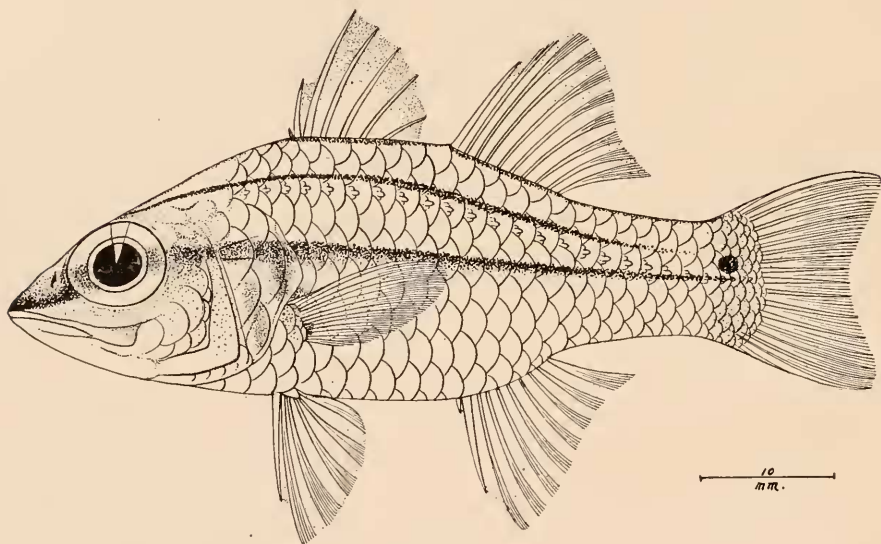


Fig. 9.—*Amia sealei* sp. nov.

first anal ray  $2\frac{1}{8}$ ; least depth of caudal peduncle  $2\frac{2}{3}$ ; caudal (damaged) about  $1\frac{2}{5}$ ?; pectoral  $1\frac{7}{8}$ ; ventral 2.

Body well compressed, rather deep, back not elevated, deepest at spinous dorsal origin, and edges rounded convexly, though slight median predorsal keel. Caudal peduncle well compressed, least depth about  $1\frac{1}{2}$  its length.

Head large, moderately long, compressed, flattened surfaces nearly evenly sloping above and below, upper profile much more inclined than lower, and rather convex. Snout short, surface convex,

<sup>9</sup> Fishes of India, I, 1875, p. 58, Pl. 16, fig. 3. Madras.



also profile, length about  $\frac{2}{3}$  its width. Eye large, circular, impinging slightly on upper profile, and head center in length midway between hind pupil and hind eye edges. Mouth moderately large, scarcely inclined from horizontal, and closed lower jaw included within upper. Maxillary large, little inclined, nearly straight, and reaches past eye center nearly opposite hind pupil edge. Terminal maxillary expansion 3 in eye, little emarginate behind, and whole upper maxillary edge slips below preorbital. Preorbital rather narrow, width about 4 in eye. Lips rather narrow, fleshy, firm. Teeth fine, even, short, in narrow bands in jaws. Also similar narrow band over vomer to and on each palatine. Tongue free, depressed, smooth, rather rounded in front. Front nostril lateral on snout, slightly nearer snout tip than eye, in short tube. Hind nostril short vertical slit close before front eye edge. Interorbital with slight furrow each side in front, slightly convex behind. Preopercle ridge entire, and hind edge minutely serrate. Opercle with small spine above and smaller one median on hind edge.

Gill-opening about opposite front pupil edge. Rakers II, 3+12, IV, lanceolate, rather robust, about  $\frac{4}{5}$  of filaments and latter 3 in eye. Pseudobranchiæ large as filaments. Isthmus long, constricted forward, and with median trenchant keel anteriorly.

Scales large, finely ctenoid, above lateral line in rows parallel with its course, and below in horizontal rows. Head scaly, cheek with 2 rows of large scales, though hind row greatly crowded or concealed under front row, and scales on opercles moderate. Suborbitals and upper surface of head with numerous mucous channels. Large scaly flap between ventral bases nearly half length of fin. Axillary ventral scale small and inconspicuous. Caudal base covered with small scales, otherwise fins naked. Lateral line complete, largely concurrent with dorsal profile. Tubes simple, extend well over scales, and with appearance as if located on somewhat small obscure accessory scale.

Spinous dorsal inserted about opposite pectoral origin, third spine longest, second and seventh subequally short, though longer than first. Soft dorsal inserted about midway between caudal base and hind eye edge, second ray apparently highest, and depressed fin  $1\frac{2}{5}$  to caudal base. Spinous anal inserted opposite second dorsal origin, first spine scarcely  $\frac{1}{5}$  of second. Soft anal smaller than soft dorsal, otherwise similar. Depressed anal  $1\frac{2}{5}$  to caudal base. Caudal very slightly emarginate behind, lobes rounded. Pectoral moderate, reaches anal, upper rays longest. Ventral inserted slightly

before pectoral origin, reaches vent or  $\frac{7}{8}$  to anal. Ventral spine  $\frac{2}{3}$  of fin.

Color in alcohol pale brownish generally, slightly paler below. Fins all pale or whitish, except brownish shade on spinous dorsal and scales at caudal base. Latter also with small jet-black round spot, less than half of pupil diameter, just above lateral line. From snout tip narrow blackish-brown line to front of eye and slopes evenly from hind eye edge to caudal base medianly, in straight course, also ends just below black caudal spot. Above this line on snout another given off each side of snout tip, extends up over interorbital then just above lateral line and finally fades out on caudal peduncle above and behind. Pale brown median line from interorbital and borders dorsal bases, continued medially behind to caudal. Opercle with 2 brownish vertical bars. Iris slaty.

Length 66 mm.

Type, No. 47,492, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also Nos. 47,493 to 47,499, paratypes, same data. These show: Head  $2\frac{2}{5}$  to  $2\frac{1}{2}$ ; depth  $2\frac{3}{4}$  to  $2\frac{4}{5}$ ; D. VII-I, 9, 1, A. II, 8; scales 23 to 26 in lateral line to caudal base and 4 more on latter; snout  $3\frac{2}{3}$  to 4 in head, measured from upper jaw tip, eye  $2\frac{1}{2}$  to 3; maxillary  $2\frac{1}{10}$  to  $2\frac{1}{4}$ ; interorbital  $4\frac{2}{5}$  to  $4\frac{4}{5}$ ; length 63 to 68 mm.

This species appears to differ chiefly in its coloration, especially the narrow lengthwise dark lines and the small black caudal spot above the lateral line, as in *A. exostigma* Jordan and Seale. Though very much narrower, the disposition of these lengthwise dark bands is like those of *A. quadrifascatus* Cuvier.

(For Mr. Alvin Seale, in slight recognition of his work in the Philippine fisheries.)

***Amia wilsoni*** sp. nov. Fig. 10.

Head  $2\frac{2}{5}$ ; depth  $2\frac{1}{5}$ ; D. VIII-I, 9, 1; A. II, 8; P. II, 12; A. I, 5; scales 22 in lateral line to caudal base and 3 more on latter; 2 scales above l.l. to spinous dorsal origin, and 6 below to spinous anal origin; about 4 predorsal scales; head width about half its length; head depth  $1\frac{2}{5}$ ; snout 4; eye  $2\frac{3}{4}$ ; maxillary  $2\frac{1}{8}$ ; interorbital  $4\frac{1}{4}$ ; third dorsal spine  $1\frac{7}{8}$ ; first dorsal ray  $1\frac{2}{5}$ ; second anal spine  $2\frac{3}{4}$ ; second anal ray  $2\frac{1}{8}$ ; least depth of caudal peduncle  $2\frac{1}{4}$ ; caudal  $1\frac{1}{3}$ ; pectoral  $1\frac{3}{5}$ ; ventral  $1\frac{2}{3}$ .

Body well compressed, rather deep, back not elevated, deepest at spinous dorsal origin, and edges rounded convexly, though slight median predorsal keel. Caudal peduncle well compressed, least depth about  $1\frac{1}{2}$  its length.

Head large, moderately long, compressed, flattened surfaces nearly evenly sloping above and below, profiles about evenly sloping above and below. Snout short, surface convex, length  $\frac{2}{3}$  its width. Eye large, circular, impinging slightly on upper profile, and center in head length about hind pupil edge. Mouth well inclined, moderately large, and closed lower jaw slightly included within upper. Maxillary large, well inclined, nearly straight, and reaches eye center. Terminal maxillary expansion 3 in eye, little emarginate behind, and whole upper maxillary edge slips below preorbital. Preorbital rather narrow, width about 4 in eye. Lips rather narrow, fleshy,

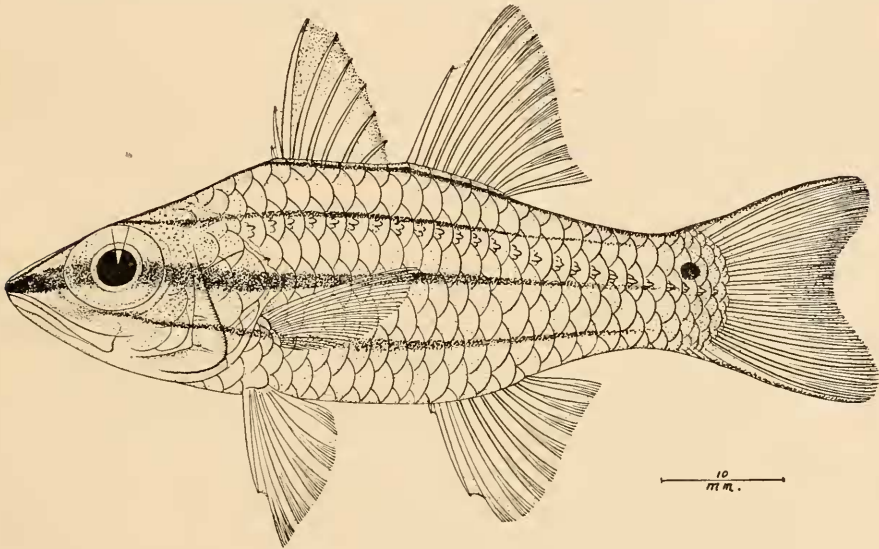


Fig. 10.—*Amia wilsoni* sp. nov.

firm. Teeth fine, even, short, in narrow bands in jaws. Also similar narrow band over vomer to each palatine. Tongue free, depressed, smooth, rather rounded in front. Front nostril lateral on snout, slightly nearer snout tip than eye, in short tube. Hind nostril simple slit at last fourth in snout. Interorbital level. Preopercle ridge entire. Hind and lower preopercle edge finely serrated. Opercle with single small spine.

Gill-opening about opposite front pupil edge. Rakers iv, 3+12, iv, lanceolate, longer than filaments or  $2\frac{2}{3}$  in eye. Pseudobranchiæ little longer than filaments. Isthmus long, constricted forwards and with median trenchant keel.

Scales large, finely ctenoid, above lateral line in rows parallel with

its course, and below in horizontal rows. Head scaly, cheek with 2 rows of large scales, and hind row of but several under front row. Opercles with scales of moderate size. Suborbitals, muzzle, preopercle and upper surface of head with numerous mucous channels marked by great numbers of minute pores. Large scaly flap between bases nearly  $\frac{2}{7}$  fin length. Axillary ventral scale about  $\frac{1}{4}$  of ventral spine. Caudal base covered with small scales, otherwise fins naked. Lateral line complete, largely concurrent with dorsal profile. Tubes simple, extend well over scales, and with appearance as if on somewhat small accessory scale.

Spinous dorsal inserted about opposite pectoral origin, third spine longest, second little shorter than seventh, and first shortest. Soft dorsal inserted about midway between eye center and caudal base, first ray highest and depressed fin  $1\frac{2}{5}$  to caudal base. Spinous anal inserted about opposite soft dorsal origin, first spine scarcely  $\frac{1}{5}$  of second. Soft anal little smaller than soft dorsal, otherwise similar. Depressed anal  $1\frac{1}{2}$  to caudal base. Caudal very slightly emarginate behind, and lobes rounded. Pectoral moderate, reaches nearly to anal, upper rays longest. Ventral inserted well before pectoral origin, reaches beyond vent or about  $\frac{7}{8}$  to anal. Ventral spine  $1\frac{1}{2}$  in fin.

Color in alcohol pale brownish generally, slightly paler below. Fins all pale, except dusky shade on spinous dorsal terminally. Upper and lower caudal edges slightly dusky. Conspicuous blackish-brown blotch on caudal base just above lateral line, in size about half of pupil. From snout tip narrow blackish-brown line to front of eye, and horizontal from hind eye edge to caudal base medially, also obscure just below caudal spot. On snout and behind eye this line wide as pupil, though on side of body narrows until like other lines. Another parallel narrower line extends from lower eye edge to middle of pectoral base and back towards lower portion of caudal peduncle. On each side of snout above narrow line extends up over interorbital close above lateral line, and fades out behind on upper surface of caudal peduncle. Finally narrow median brownish line begins on interorbital and extends to spinous dorsal, borders base of each dorsal fin and then forms single median line again on postdorsal to caudal. Iris slaty.

Length 72 mm.

Type, No. 47,505, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Greatly resembles the preceding species, but differs at once in coloration. Besides the presence of the third lateral line below, the larger caudal spot and wider median lateral band anteriorly, there are no dark bars on the opercle.

(To Dr. William P. Wilson, of the Commercial Museums of Philadelphia, to whom I am indebted for the opportunity to study the present collection.)

*Amia radcliffei* sp. nov. Fig. 11.

Head  $2\frac{2}{5}$ ; depth  $2\frac{4}{5}$ ; D. VII-L, 9, 1; A. II, 8, 1; P. II, 10; V. I, 5; scales 23 in lateral line to caudal base and 4 more on latter; 2 scales between spinous dorsal origin, and lateral line, and 6 scales in vertical

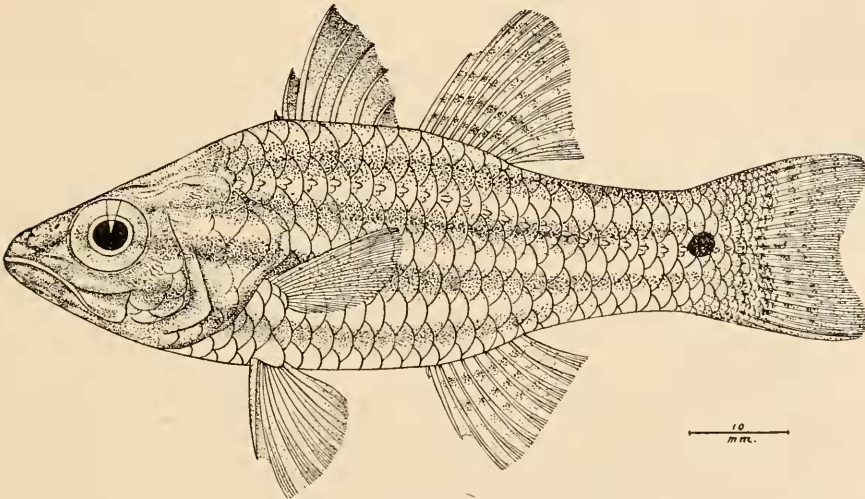


Fig. 11.—*Amia radcliffei* sp. nov.

series to spinous anal origin; 4 predorsal scales; head width 2 in its length; head depth at occiput  $1\frac{2}{5}$ ; snout  $3\frac{2}{3}$ ; eye  $3\frac{2}{3}$ ; maxillary 2; interorbital 5; third dorsal spine  $2\frac{1}{5}$ ; first dorsal ray  $1\frac{4}{5}$ ; second anal spine  $3\frac{1}{2}$ ; second anal ray (damaged)  $2\frac{2}{5}$ ; least depth of caudal peduncle  $2\frac{1}{3}$ ; caudal (damaged) about  $1\frac{1}{2}$ ; pectoral 2; ventral 2.

Body well compressed, moderately deep, back not elevated, deepest at spinous dorsal origin, and edges rounded convexly, predorsal scarcely with median keel. Caudal peduncle well compressed, least depth  $1\frac{2}{5}$  its length.

Head large, moderately long, compressed, flattened surfaces slightly swollen below, profiles nearly straight and similarly inclined. Snout moderate, surface convex, length about  $\frac{3}{4}$  of width. Eye



large, circular, next to upper profile, and head center in length nearly at hind eye edge. Mouth large, rather well inclined, and closed lower jaw included within upper. Maxillary large, well inclined, nearly straight and reaches past eye center about to hind pupil edge. Terminal maxillary expansion 2 in eye, slightly emarginate behind, and whole upper maxillary edge slips below preorbital. Latter moderate, width 3 in eye. Lips moderate, fleshy, firm. Teeth fine, even, short, in moderately wide bands in jaws. Narrow band over vomer to and on each palatine. Tongue free, depressed, smooth, rounded in front. Inner buccal folds rather narrow. Front nostril short inconspicuous tube about midway in snout. Hind nostril moderate pore close before, and nearer eye, than front nostril. Interorbital generally depressed, with slight furrow each side. Preopercle ridge entire, hind edge finely serrate. Opercle with single small spine.

Gill-opening forward about opposite hind nostril. Rakers II, 4+12, II, rather robust, lanceolate, nearly long as filaments, which 3 in eye. Pseudobranchiæ about long as filaments. Isthmus long, constricted forward, and with median keel, especially trenchant forward.

Scales large, finely ctenoid, above lateral line in rows parallel with its course, and below in horizontal rows. Head scaly, cheek with 2 rows, and opercles with moderate scales. Head above and mandible with numerous mucous channels. Large scaly flap between ventral bases about  $\frac{2}{5}$  length of fin. Axillary ventral scale moderate, rounded. Caudal base covered with small scales, fins otherwise naked. Lateral line complete, largely concurrent with dorsal profile. Tubes simple, extend well over scales, large, and with appearance as if located on small obscure accessory scale.

Spinous dorsal inserted slightly behind pectoral origin, or about midway between snout tip and middle of last depressed dorsal ray, all spines slightly curved, third longest, second little longer than seventh, and first very short. Soft dorsal inserted nearly midway between hind eye edge and caudal base, spine  $\frac{3}{5}$  of fin, and depressed fin  $1\frac{1}{5}$  to caudal base. Spinous anal origin about opposite that of soft dorsal, and with soft anal much smaller than soft dorsal, though reaches about as far posteriorly. First anal spine about  $\frac{1}{5}$  length of second. Caudal broad, slightly emarginate behind, and lobes rounded. Pectoral broad, not quite to anal origin. Ventral inserted well before pectoral origin, fin depressed  $\frac{3}{4}$  to anal origin, spine about  $\frac{5}{7}$  in fin. Vent little nearer depressed ventral tip than anal origin.

Color in alcohol dull brownish, more or less with general dull sooty tint, below well as above. Four obscure dark longitudinal bands, broad at first and narrow behind. First on back above lateral line, then along upper edge of caudal peduncle. Second from shoulder just below lateral line, and crosses latter below hind portion of soft dorsal. Third as band on snout tip, behind eye and crosses opercle back above pectoral to base of lower caudal lobe. Fourth obscurely along lower edge of abdomen. Caudal base with round jet-black spot about size of pupil, slightly above middle. Muzzle sooty-brown. Iris slaty. Fins all pale, outer portion of spinous dorsal brownish, and soft dorsal, anal and caudal all with 3 or 4 rows of small brown spots transversely. Gill-opening edge below broadly dusted dusky-brown, also lower surfaces of ventrals.

Length 90 mm. (caudal damaged).

Type, No. 47,500, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also Nos. 47,501 to 47,504, A. N. S. P., paratypes; same data. They show: Head  $2\frac{2}{5}$  to  $2\frac{1}{2}$ ; depth  $2\frac{7}{8}$  to 3; D. VII-I, 9, 1, and one VII-I, 10, 1; A. II, 8, 1; scales 22 to 24 in l.l. to caudal base and 4 or 5 more on latter; snout  $3\frac{3}{5}$  to 4 in head; eye 3 to  $3\frac{3}{5}$ ; maxillary 2; interorbital 5 to  $5\frac{1}{2}$ ; length 75 to 90 mm.

Allied with *Amia hartzfeldi* Bleeker,<sup>10</sup> but that species is figured by its author with the dark caudal spot median basally, and but one blackish bar sub-basally on soft dorsal and anal, also scales on cheek in 4 rows, and maxillary longer.

(For Mr. Louis Radcliffe, of the Bureau of Fisheries at Washington, who studied the cardinal fishes of the Philippines.)

***Amia savayensis*** (Günther).

A large series of this very variable species, 40 to 73 mm. in length. Sixteen agree with Günther's figure in most cases, but as they have long been in formaline the color-pattern has largely faded. In some the dark vertical stripes are very narrow, as the dark bands in all are margined each side with a still darker tint, and all the intervening color fading leaves them increased from the original eight to twice that number. The broad dark band on the caudal peduncle is present only as a saddle above. Every one of these examples have the oblique dark streak from the lower corner of the eye across the cheek. Upon comparison with eight specimens from Apia,

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<sup>10</sup> Atlas Ich. Ind. Néerl., VIII, 1876-7, Pl. 69, fig. 2.

Samoa, all smaller, the dark streak from the eye to the preopercle angle is narrow, not quite so wedge-shaped as in the Manila examples. Also some show the dark saddle on the caudal peduncle simply as a dark blotch above the lateral line.

The rest of the series embraces 115 examples; all seem to agree in the dull unicolored caudal. They show underlaid traces of the three vertical broad dark bands of *A. bandanensis*, but only one on the caudal peduncle distinct, while others give place to about six vertical and rather broad bands in the space between the head and last dorsal ray's base.

*Apogon savayensis* Day<sup>11</sup> may represent a species distinct from the present one, as it is described and figured with the hind caudal edge dusky. It also has three broad dark vertical bands, one from each dorsal and the other a saddle on the caudal peduncle above. It surely approaches more closely Bleeker's *A. bandanensis*, which is figured with a uniform caudal.

*A. nubilus* Garman<sup>12</sup> is closer to my larger lot of specimens grouped above under the present species, but differs in the dark bar on the caudal basally, the dark broad vertical underlaid shades on the body below the dorsal fins, and the caudal peduncle blotch complete. Jordan and Seale say it is apparently the young of *Amia savayensis* with the markings faded.

***Archamia zosterophora*** (Bleeker). Fig. 12.

Head  $2\frac{3}{7}$ ; depth  $2\frac{3}{5}$ ; D. VI-I, 9, 1; A. II, 15; P. II, 12; V. I, 5; scales (pockets) 20 in lateral line to caudal base and 4? more on latter; 2 scales (pockets) above l.l. to spinous dorsal origin, and about 6 below in vertical series to spinous anal origin; 6 predorsal scales; head width  $2\frac{1}{3}$  its length; head depth  $1\frac{1}{5}$ ; mandible  $1\frac{5}{6}$ ; third dorsal spine  $2\frac{3}{4}$ ; second dorsal ray  $1\frac{1}{2}$ ; second anal spine  $2\frac{3}{4}$ ; first branched anal ray  $1\frac{7}{8}$ ; least depth of caudal peduncle  $2\frac{3}{4}$ ; upper caudal lobe  $1\frac{2}{5}$ ; pectoral  $1\frac{3}{5}$ ; ventral  $2\frac{3}{8}$ ; snout  $4\frac{1}{5}$  in head measured from upper jaw tip; eye  $2\frac{4}{5}$ ; maxillary  $2\frac{1}{5}$ ; interorbital  $3\frac{4}{5}$ .

Body well compressed, contour rather elongately ovoid with greatest depth at dorsal origin, and edges all convexly rounded. Caudal peduncle well compressed, least depth  $1\frac{1}{3}$  its length.

Head deep, well compressed, flattened sides slightly approximated below, and lower profile very much more steep and convex than upper. Snout convex over surface, length about half its width. Eye large, close to upper profile, rounded, and hind edge about

<sup>11</sup> Fishes of India, I, 1875, p. 60, Pl. 16, fig. 5.

<sup>12</sup> Bull. Mus. Comp. Zool., 39, 1903, p. 230, Pl. 1, fig. 1. Suva, Fiji.

midway in head length. Mouth large, well inclined, mandible slightly protruding in front. Maxillary well inclined, straight, reaches opposite last fourth in pupil, and terminal expansion about  $2\frac{1}{2}$  in eye, its hind edge slightly emarginate. Upper maxillary edge slips below preorbital except very short part of hind edge. Teeth minute, in narrow bands in jaws and apparently absent from mouth roof. Lips narrow, little fleshy. Tongue free, smooth, depressed, rather narrowly triangular. Inner buccal folds narrow. Front nostril small pore about first third in snout, and hind nostril short slit very close to front eye edge. Interorbital nearly level. Sub-

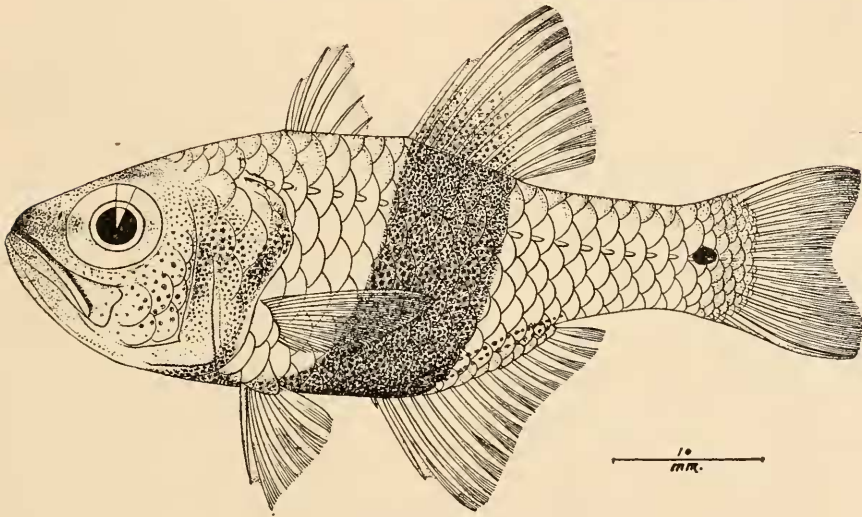


Fig. 12.—*Archamia zosterophora* (Bleeker).

orbital width about half of pupil. Preopercle ridge entire, with broad short spine at angle, and hind edge finely denticulate. Opercle without spine.

Gill-opening forward opposite front eye edge. Rakers  $6+14$ , lanceolate, twice length of filaments or 2 in eye. Pseudobranchiæ long as gill-filaments. Isthmus narrowly compressed, slightly attenuated forwards, with trenchant edge, especially anteriorly.

Scales caducous, large, narrowly imbricated, in longitudinal series, minutely ctenoid. Scales in 2 rows on cheek, and scales on opercles moderate. Axillary ventral scale moderate, broad, pointed, about  $\frac{2}{3}$  length of spine. Caudal base scaly, also anal base. Lateral line complete, concurrent with dorsal profile. Tubes large, trifid, well exposed. Bones of head rather cavernous. Suprascapula edge jagged.

Spinous dorsal origin little behind that of pectoral, fin low and spines weak, or slender, third longest with second and fourth subequal, depressed fin not quite reaching soft dorsal. Latter inserted about midway between eye center and caudal base, spine about half fin length, which depressed extends  $\frac{3}{5}$  to caudal base. Anal inserted well before soft dorsal origin or about midway between front eye edge and caudal base, first branched ray longest though second subequal, and when depressed neither reach last dorsal ray base. Caudal emarginate, lobes rounded. Pectoral broad, reaches about first third in anal base. Ventral inserted before pectoral origin, reaches anal, and spine  $\frac{2}{3}$  of fin. Vent close before anal.

Color in alcohol very pale or light brownish generally, scales on back above obscurely and finely dusted with slightly darker brownish. On postocular, cheek and suborbital a number of dull brown dots, some enlarged slightly. Blackish-brown band from snout tip to eye. On shoulder-girdle behind gill-opening, blackish brown streak forward to breast which same color. This also extends back over belly below, rising up obliquely after ventral bases to second dorsal fin as broad dark band, in width about equal to  $1\frac{1}{2}$  eye-diameters. It is also reflected out on soft dorsal basally, but not the anal. All dark area noted made up of large crowded dark specks, larger and more sparse below. At caudal base round jet-black spot, median, and less than half of pupil in diameter. Fins, except coloration of soft dorsal and caudal base as noted, all uniform pale or brownish-white.

Length 58 mm.

Twelve examples from the Philippine Islands. Presented by the Commercial Museums of Philadelphia. Eleven show: Head  $2\frac{1}{3}$  to  $2\frac{1}{2}$ ; depth  $2\frac{4}{7}$  to  $2\frac{2}{3}$ ; D. VI-I, 9, 1; A. II, 15, 1 or 16, 1, rarely 14, 1; scales 19 or 20 in l.l. (pockets) to caudal base; snout 4 to  $4\frac{1}{2}$  in head measured from upper jaw tip; eye  $2\frac{4}{5}$  to 3; maxillary  $1\frac{4}{5}$  to  $2\frac{1}{5}$ ; interorbital  $3\frac{3}{4}$  to 4; length 53 to 63 mm.

I redescribe this species as my material differs somewhat from both the description and figure by Bleeker.<sup>13</sup> This is especially evident in the broad dark band extending forward on the breast, and the black caudal spot not half the pupil diameter. Bleeker's figure does not show the former before the ventral bases and its forward limit is not mentioned in the description. He shows the caudal spot large as the eye. Weber's note<sup>14</sup> does not add sufficient detail to help solve this point.

<sup>13</sup> Atlas Ich. Ind. Néerl., VII, 1873-6, p. 103.

<sup>14</sup> Siboga Exp., Fische, 1913, p. 5.



**Epinephelus matterni** sp. nov. Fig. 13.

Head  $2\frac{2}{3}$ ; depth 3; D. XI, 15, 1; A. III, 8, 1; P. II, 16, 1; V. I, 5; scales 92 in lateral line to caudal base, and about 6 more on latter; tubes in l.l. 52 to caudal base and 5 more on latter; 17 scales in vertical series above l.l. to spinous dorsal origin; 11 scales in vertical series between soft dorsal origin and l.l.; about 27 scales in vertical series between spinous anal origin and l.l.; head width  $1\frac{4}{5}$  its length; head depth at occiput  $1\frac{2}{3}$ ; mandible 2; third dorsal spine  $2\frac{3}{5}$ ; second branched dorsal ray  $2\frac{1}{4}$ ; second anal spine  $2\frac{7}{8}$ ; second branched anal ray  $2\frac{1}{4}$ ; least depth of caudal peduncle  $3\frac{1}{5}$ ; caudal  $1\frac{3}{5}$ ; pectoral  $1\frac{1}{2}$ ; ventral 2; snout  $4\frac{1}{4}$  in head measured from upper jaw tip; eye 5; maxillary  $2\frac{1}{5}$ ; interorbital 6.

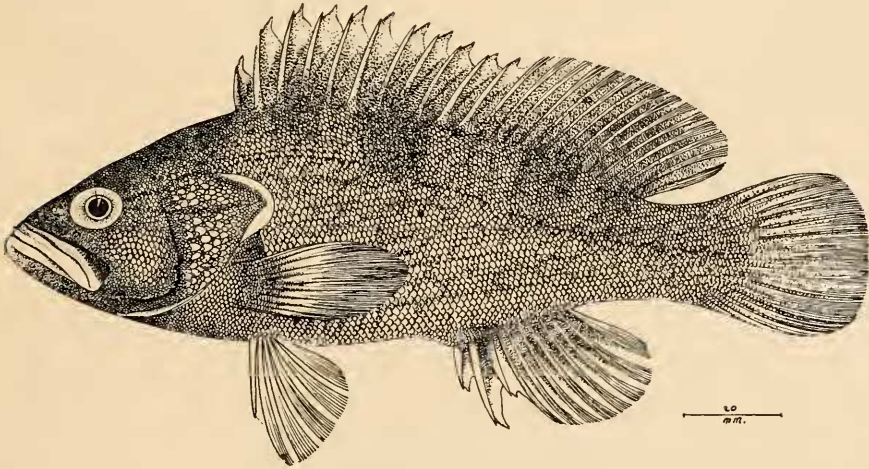


Fig. 13.—*Epinephelus matterni* sp. nov.

Body robust, elongate, compressed, profiles rather evenly convex, though upper little more so, contour slightly ovoid with greatest depth about base of fifth dorsal spine. Body edges rounded convexly, chest and belly broadly so. Caudal peduncle compressed, length about  $\frac{3}{4}$  its least depth.

Head rather large, compressed, greatest width slightly swollen below, profiles similarly inclined and nearly straight. Snout convex over surface, profile obliquely straight, and length about  $\frac{3}{5}$  its width. Eye little longer than deep, rounded, close to upper profile and center near first third in head. Mouth oblique, and broad mandible protruding in front. Lips rather broad, thick or fleshy. Maxillary well exposed, reaches about opposite hind pupil edge, and expansion  $1\frac{3}{5}$  in eye. Bands of rather small fine teeth in jaws, a few canine-like

in front of upper and along rami of mandible posteriorly, where also in but 2 rows on each ramus. Latter but little elevated inside mouth. Bands of much smaller teeth across vomer and on each palatine. Buccal folds moderately broad in mouth. Tongue depressed, smooth, free, and attenuated. Nostrils close together on side of snout, also close before front eye edge, front one with short tube and short cutaneous flap behind. Preorbital narrow,  $2\frac{1}{4}$  in eye. Interorbital slightly convex. Preopercle edge slightly convex behind, finely serrated and with about 5 enlarged denticles around corner. Opercular spines 3, median largest, closer to lower and little posterior.

Gill-opening extending forward opposite front eye edge, and uppermost edge but slightly inclined from horizontal. Rakers IV, 3+9, IV, lanceolate, and longest about equal gill-filaments or  $2\frac{1}{3}$  in eye. Pseudobranchiæ about  $\frac{3}{4}$  of gill-filaments. Isthmus broad, bevelled in front, with slight keel behind.

Scales all finely ctenoid, largest on trunk, smaller along body edges, especially predorsal, breast and belly. Very small scales on head above, with crowded smaller ones basally, these also extend over postocular and suborbital regions, and cheek. Small scales also crowded about upper part of opercular flap. Very small scales over mandible, and about 10 rows on maxillary. Scales on trunk in more or less horizontal rows, crossing lateral line. Minute scales over basal portions of all fins more or less. Pectoral axil with pit, sheathed above by broad flap covered with small scales. Though of irregular size scales on cheek in about 25 rows from eye to lower preopercle angle. Lateral line of simple inclined tubes little exposed, and its course nearly concurrent with dorsal profile, out on caudal base medianly.

Spinous dorsal inserted little nearer snout tip than origin of soft dorsal, spines graduated down from third which longest, edge deeply notched with cutaneous point behind each spine tip. Soft dorsal inserted midway between spinous dorsal origin and caudal base, fin oblong, rounded in front and behind. Spinous anal inserted little nearer ventral origin than caudal base, second spine longest, third but little shorter, and first  $\frac{2}{5}$  of second. Soft anal rounded, also caudal. Pectoral broad, reaches about  $\frac{5}{6}$  to anal, and median rays longest. Ventral inserted close behind pectoral base, depressed fin reaching  $\frac{3}{5}$  to anal, and spine about  $\frac{3}{5}$  fin length. Vent at first third in space between depressed ventral tips and anal origin.

Color in alcohol brownish generally, only paler or much lighter

on extreme lower surface of head, breast and belly. About 5 indistinct deep brown obscure slightly inclined band-like saddles on back, first at predorsal, second on spinous dorsal medially, third just before soft dorsal, fourth at front median region of soft dorsal, and fifth at hind portion of soft dorsal. Whole trunk and head with slightly inclined dark streaks, irregularly and obscurely, slightly wavy, and quite numerous, but not parallel with rows of scales. Also ground-color with many pale blotches, spots or streaks, underlaid and obscure. Head more with speckled or spotted appearance than trunk. Coloration of latter extends on vertical fins more or less basally. Maxillary with brownish streak on scaly area. Fins all with obscure speckled appearance. Iris slaty-gray.

Length 178 mm.

Type, No. 47,506, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

This species is allied with *E. bontoides* (Bleeker), *E. megachir* (Richardson), *E. diacanthus* (Valenciennes) and *E. maculatus* (Bloch) in its biserial mandibular teeth. It most closely approaches *E. bontoides* in its equidistant opercular spines and mostly ciliated scales. These characters also agree with *E. megachir*, but that species has the pectoral long as its head. From *E. bontoides* it differs at once from any material or accounts I have seen, in color. This has been described as brown above with more or less numerous black dots, which may not be present on the fins.

#### **RHOMBOPLITOIDES** gen. nov.

Type *Rhomboplitoides megalops* sp. nov.

This genus of *Lutianidae* resembles the American *Rhomboplites* in its scaly soft dorsal and anal fins, but differs in squamation, as the scales above the lateral line in oblique rows and those below in horizontal rows. It falls within the *Lutianinae* in its entire inter-orbital and dentition.

(*Rhomboplites*; εἶδος, appearance.)

**Rhomboplitoides megalops** sp. nov. Fig. 14.

Head  $2\frac{1}{2}$ ; depth 3; D. XI, 11, 1; A. III, 8; P. II, 15; V. I, 5; scales 51 in lateral line to caudal base and 7 more on latter; 7 scales above l.l. to spinous dorsal origin, and 14 below in vertical row to spinous anal origin; 25 predorsal scales; head width  $2\frac{1}{10}$  in its length; head depth at occiput  $1\frac{1}{2}$ ; mandible  $2\frac{1}{10}$ ; third dorsal spine  $2\frac{1}{2}$ ; first branched dorsal ray  $3\frac{1}{2}$ ; third anal spine  $2\frac{1}{2}$ ; first branched anal ray  $2\frac{2}{3}$ ; least

depth of caudal peduncle  $3\frac{1}{8}$ ; caudal  $1\frac{3}{7}$ ; pectoral  $1\frac{1}{8}$ ; ventral  $1\frac{3}{4}$ ; snout  $3\frac{3}{5}$  in head measured from upper jaw tip; eye 3; maxillary  $2\frac{2}{5}$ ; interorbital 4.

Body elongate, contour evenly fusiform with greatest depth at fourth dorsal spine base, and edges all convex, or with but slight keel just before dorsal. Caudal peduncle compressed, about long as deep.

Head large, well compressed with flattened sides little approximated below, and profiles evenly and slightly convex. Snout rather conic, convex over surface and slightly so in profile, length about  $\frac{3}{4}$  its width. Eye very large, impinging on upper profile, and hind pupil edge near head center in length. Mouth large, oblique, and

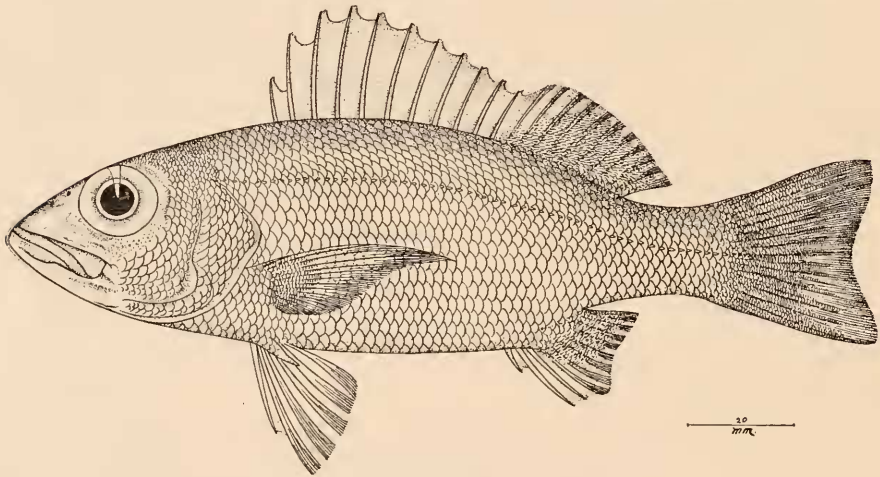


Fig. 14.—*Rhomboplitoides megalops* sp. nov.

gape extends about opposite front nostril. Premaxillaries moderately protractile. Maxillary oblique, upper edge entirely slips below preorbital, reaches first third in eye, and expansion  $2\frac{1}{2}$  in eye. Lips thick, firm, tough, largely conceal teeth, lateral in jaws. Teeth in jaws in narrow bands, villiform, and with outer row of simple enlarged well-spaced canines, only visible in profile in front of upper and side of lower. Vomer with an elongate patch of villiform teeth, in outline similar to a narrow kite. Each palatine with narrow well-developed band of villiform teeth. Mandible rather robust, moderately deep, rami little elevated inside mouth, and symphysis slightly protrudes when closed. Buccal folds within mouth rather narrow. Nostrils rather large, simple, front one near last third in



snout length and hind one little larger, elevated, close before eye above. Interorbital about level. Preorbital width narrow, entire slightly less than a third of eye. Preopercle edge minutely denticulate, with slight indenture above angle. Opercle ends in 2 rather weak points.

Gill-opening forward beyond front pupil edge though not quite to front eye edge. Rakers 8+16, lanceolate, robust, nearly half of eye-diameter. Gill-filaments short, about  $\frac{3}{5}$  of rakers. Pseudo-branchiae very large, about long as rakers. Isthmus narrowly constricted, with groove in front.

Scales all finely ctenoid, smaller on breast, predorsal, edges of caudal peduncle, and head above. Above lateral scales in slightly inclined rows to dorsal profile, below in horizontal rows. Most of head scaly, except muzzle and broad rim around eye. Front of interorbital naked and squamation from occiput forward about opposite center of eye. Cheek with 5 rows of scales to preopercle ridge, and on preopercle flange row of broad scales with several smaller, scattered irregular scales. Subopercle, interopercle and opercle scaly, also sides of head above. Caudal covered with small scales, also bases of soft dorsal, anal, pectoral and ventral. Pointed free axillary ventral scaly flap,  $2\frac{1}{2}$  in fin. Lateral line complete, largely concurrent with dorsal profile, tubes simple and little exposed. On side of caudal peduncle lateral line little superior at first, median at caudal base.

Spinous dorsal inserted little behind pectoral origin, or little nearer soft dorsal origin than snout tip, spines long and slender, fourth longest and others graduated down, fin edge apparently little notched. Soft dorsal origin nearer caudal base than spinous dorsal origin, fin low, rounded or convex, last ray not produced, and not quite reaching caudal base. Anal begins about opposite soft dorsal origin, third spine longest with second little shorter, rayed fin little higher in front than soft dorsal and not extended so far posteriorly. Caudal moderate, hind edge very slightly emarginate. Pectoral long, falcate, reaches vent. Ventral inserted close behind pectoral base or but slightly before spinous dorsal origin, reaches  $1\frac{1}{2}$  to anal, spine  $1\frac{1}{2}$  in fin. Vent midway between ventral tips and anal origin.

Color in alcohol uniform pale brownish, fins scarcely tinted darker. Iris slaty.

Length 162 mm.

Type, No. 47,507, A. N. S. P.



Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Only the type known.

(*Méγας*, large; *ωψ*, eye.)

**Nemipterus luteus** (Bloch).

A single example which agrees with the smaller one figured from Cavite by Jordan and Seale.<sup>15</sup> Though they state "scales about 44" their figure shows 48 tubes in the lateral line, a point in agreement with my example.

**MESOPRISTES** Bleeker.

*Mesopristes* Bleeker, Nat. Genees. Arch. Ned. Indie (Topogr. Batav.) II, 1845, p. 523. Type *M. macracanthus* Bleeker (= *Datnia argentea* Cuvier), monotypic.

This genus has been described under *Datnia* Cuvier by Day,<sup>16</sup> but as Cuvier's type is *Coius datnia* B. Hamilton by tautonymy, *Datnia* merges with the sparoids.

**Mesopristes plumbeus** (Kner). Ayungen.

*Datnia plumbea* Kner, Sitz. Akad. Wiss. Wien (May 12) 49, 1864, p. 484. Vom Capoder der Insel S. Paul.

—Kner, Reise. Novara, Fische, 1865, p. 48, Pl. 3, fig. 2. "Fundort unsicher, angeblich von Java."

*Therapon brevispinis* (non Steindachner) Peters, Monatsb. Ak. Wiss. Berlin, 1868, p. 256. *Quingoa flum.*, Provinc Bulacan, Luzon, P. I.

*T. brachycentrus* Peters, l. c., 1869, p. 705.

? *T. knerii* Bleeker, Atlas Ich. Ind. Néerl., VII, 1873-6, p. 115. Based on *T. argenteus* (non Cuvier) Kner, Sitz. Ak. Wiss. Wien, 58, 1868, p. 299, Pl. 1, fig. 1. Kandavu, Fiji.

Head 3 to  $3\frac{1}{6}$ ; depth  $2\frac{1}{2}$  to  $2\frac{3}{4}$ ; D. XII, 8 to 10; A. III, 8; scales 43 to 50 in lateral line to caudal base, and 3 or 4 more on latter; 7 or 8 scales above l.l. to spinous dorsal origin; 13 to 15 scales below l.l. to spinous anal origin; 16 to 20 predorsal scales; snout  $3\frac{1}{4}$  to  $3\frac{1}{2}$  in head; eye  $3\frac{2}{3}$  to 4; maxillary 3 to  $3\frac{1}{4}$ ; interorbital  $3\frac{3}{4}$  to  $3\frac{4}{5}$ . Body compressed, deepest at front of spinous dorsal. Head compressed, upper profile slightly concave. Snout convex, length  $\frac{4}{5}$  its width. Eye rounded, close to upper profile, hind edge little posterior from middle in head length. Maxillary slightly beyond front eye edge, not to pupil. Teeth fine, in bands in jaws, outer row little enlarged. Mouth roof toothless. Tongue free, elongate, rounded in front. Jaws about even. Front nostril slightly nearer eye than snout tip, hind one slit above eye. Hind preopercle edge finely serrate. Interorbital nearly flat. Rakers 9 or 10+18 or 19, lanceolate, 2 in filaments and latter  $1\frac{3}{5}$  in eye. Scales small, mostly uniform, smaller

<sup>15</sup> Bull. Bur. Fisher., XXV, 1906 (1907), p. 21.

<sup>16</sup> Fishes of India, I, 1875, p. 71.

along body edges and caudal base. Few small scales on soft dorsal and anal basally, also pectoral. Cheek with 5 rows of scales. L.l. concurrent with back and body scales in nearly parallel rows. Tubes small, simple, greatly exposed. Fourth dorsal spine  $1\frac{3}{4}$  in head, fin edge deeply notched. Soft dorsal small, well back, first ray  $2\frac{1}{3}$  in head. Second anal spine usually longest, 2 in head, though third often subequal. Caudal very slightly emarginate behind,  $1\frac{1}{4}$  in head. Pectoral rounded,  $1\frac{3}{4}$  in head. Ventral  $1\frac{2}{3}$  in head, spine  $1\frac{3}{5}$  in fin. Color in alcohol pale olive brownish above, each row of scales with slightly darker line. Spinous dorsal edge dusky, also soft dorsal, anal and caudal tinted with dusky, other fins pale. Iris pale slaty. Length 116 to 140 mm. Philippine Islands.

A very large series of individuals in the present collection, and they cover the discrepancies found in the accounts listed above. Kner's figure of *D. plumbea* does not show any small scales on the soft dorsal and anal bases. Bleeker has separated *T. kneri*, as Kner gives more numerous scales, and more pointed elevated dorsal and anal, etc. Jordan and Seale entirely overlook<sup>17</sup> Bleeker's reference and list *T. kneri* as "*T. argenteus* Kner," and as the locality Kandavu is in heavy-faced type, they may have thought it distinct from *T. argenteus* Cuvier, under which they place it.

***Upeneoides philippinus* sp. nov. Fig. 15.**

Head  $3\frac{2}{5}$ ; depth  $3\frac{3}{4}$ ; D. VIII-I, 8, 1; A. I, 6, 1; P. II, 14; V. I, 5; scales 35 in lateral line to caudal base, and 4 more on latter; 3 scales above l.l. to spinous dorsal origin, and 7 below to spinous anal origin; 16 predorsal scales; head width  $1\frac{3}{5}$  its length; head depth at occiput  $1\frac{1}{4}$ ; snout  $2\frac{1}{2}$ ; eye  $4\frac{2}{5}$ ; maxillary  $2\frac{2}{5}$ ; interorbital  $3\frac{1}{5}$ ; second dorsal spine  $1\frac{1}{3}$ ; first branched dorsal ray  $2\frac{1}{8}$ ; anal spine 3; first branched anal ray 2; least depth of caudal peduncle  $2\frac{3}{5}$ ; pectoral  $1\frac{1}{3}$ ; ventral  $1\frac{2}{3}$ .

Body elongately ovate, deepest at spinous dorsal origin, edges all broadly convex. Caudal peduncle well compressed, least depth about  $1\frac{7}{8}$  in its length.

Head well compressed, flattened sides slightly converge below, profiles convex and upper more inclined. Snout convex in profile and over surface, nearly long as broad. Eye moderate, rounded, close to upper profile, and hind pupil edge about midway in head length. Mouth moderate, little inclined from horizontal, and lower jaw slightly included in upper. Maxillary reaches about opposite front pupil edge, expansion  $1\frac{1}{2}$  in eye. Lips rather narrow, fleshy.

<sup>17</sup> Bull. Bur. Fisher., 1905 (1906), p. 266.

Teeth granular, in about 3 irregular rows in each jaw. Patch of granular teeth on vomer and each palatine. Inner buccal folds narrow. Tongue fleshy, thick, not free. Mandible shallow, rami not elevated inside mouth. Barbels short, and scarcely extend beyond hind eye edge. Nostrils greatly distant, front one simple pore about last  $\frac{2}{3}$  in snout, hind one short slit close before eye. Interorbital very slightly convex. Preorbital broad, width slightly greater than eye. Preopercle edge entire. Opercle with 2 small concealed spines, close and above.

Gill-opening forward about opposite hind nostril. Rakers 6+10, VI, lanceolate, slender,  $1\frac{1}{2}$  in filaments, and latter  $1\frac{1}{5}$  in eye.

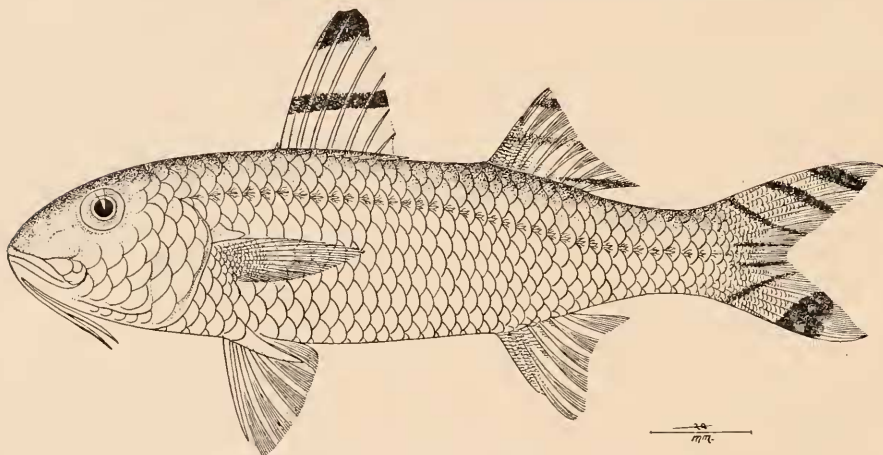


Fig. 15.—*Upeneoides philippinus* sp. nov.

Pseudobranchiæ about half length of gill-filaments. Isthmus narrowly constricted.

Scales uniformly large, finely ctenoid, in lengthwise rows parallel with lateral line. Small scales over most of caudal basally and front of soft dorsal and anal. Head scaly, and 2 rows of scales on cheek to preopercle ridge. Several large scales on exposed maxillary expansion. Pectoral axil with firm adipose scale above. Ventral with free pointed scaly flap  $1\frac{2}{3}$  in fin. Broad scaly flap between ventral bases  $\frac{1}{3}$  fin length. Lateral line concurrent with dorsal profile, well out on caudal base, tubes well exposed and each with several small branches.

Spinous dorsal inserted little nearer front nostril than second dorsal origin, second spine longest with third and fourth subequal, depressed fin  $\frac{4}{5}$  to soft dorsal. Last inserted midway between

spinous dorsal origin and caudal base, first branched ray longest with spine  $\frac{3}{5}$  its length, and depressed  $\frac{2}{3}$  to caudal base. Anal origin slightly behind second dorsal, fin similar though smaller. Caudal well forked, sharp pointed lobes about equal. Pectoral small, pointed, reaches  $1\frac{3}{5}$  to second dorsal origin. Ventral origin close behind pectoral base, though before spinous dorsal origin, reaches  $1\frac{7}{8}$  to anal. Ventral spine about  $\frac{5}{6}$  of fin.

Color in alcohol faded largely uniform dull brownish, lower surfaces scarcely paler. Spinous dorsal pale, apex broadly jet-black, and median brown horizontal band. Soft dorsal pale with three nearly horizontal dusky bands, uppermost apical and lowermost on hind rays. Caudal whitish, upper lobe crossed by three oblique broad dusky-brown bars, and lower lobe with two, but outer very broad and black. Median caudal rays also dusky. All other fins pale brownish. Iris pale slaty.

Length 180 mm.

Type, No. 47,508, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also Nos. 47,509 to 47,511, paratypes, same data. These show: Head  $3\frac{1}{5}$  to  $3\frac{2}{5}$ ; depth  $3\frac{1}{2}$  to  $3\frac{4}{5}$ ; D. VIII-I, 8, 1; A. I, 6, 1; scales 35 in lateral line to caudal base and 4 more on latter; 3 scales above l.l. to dorsal origin, and 6 or 7 below to anal origin; 14 predorsal scales; snout  $2\frac{3}{4}$  to 3 in head; eye  $3\frac{4}{5}$  to  $4\frac{1}{6}$ ; maxillary  $2\frac{1}{4}$  to  $2\frac{3}{5}$ ; interorbital  $3\frac{1}{2}$  to 4; rakers 7 or 8+13, iv or 14, iv; length 120 to 149 mm.

Allied, if not identical with *Upeneoides vittatus* (Forskål), but apparently differs in the presence of but two black bars on the lower caudal lobe, the outer quite broad. The oldest synonym of *U. vittatus* is *Mullus bandi* Shaw,<sup>18</sup> based on Russell's *Badi goolivinda*.<sup>19</sup> This is doubtless *U. vittatus* and Russell says "the length seldom exceeds six inches." Shaw apparently copies Lacépède's crude figure, showing lower caudal lobe likely for the present or a closely allied species. Russell's figure has three dark lower caudal bars, but obliquely parallel with those of upper lobe! Russell also shows spinous dorsal tip not black, though fin crossed obliquely with three dark bars, and soft dorsal end dark, also fin crossed by two oblique dark bars. *Upeneus biteniatus* Bennett<sup>20</sup> is simply diagnosed with two golden bands below lateral line, and dorsal and caudal with oblique black streaks.

<sup>18</sup> Gen. Zool., IV, 1803, p. 615, Pl. 89.

<sup>19</sup> Fishes of Coromandel, II, 1803, p. 43, Pl. 158 (-60). Vizagapatam.

<sup>20</sup> Proc. Zool. Soc. London, 1830-1, p. 59. Mauritius.

Under *Upeneoides vittatus* later writers, as Günther,<sup>21</sup> Bleeker,<sup>22</sup> Day<sup>23</sup> and Sauvage<sup>24</sup> mention the lower caudal lobe with three dark oblique bars. Günther mentions two or three such bars, with adult material about a foot in length. Bleeker's figure shows greater upper portion of spinous dorsal black, only broad pink lengthwise band below middle. It also has soft dorsal apex black with two yellow lengthwise bands. Its caudal differs from Day's figure in innermost black bars leaving only narrow pale area, also tips of both lobes black, and bar next black tip on lower lobe twice wide as one nearer caudal base. Day's figure shows dark bars on lower caudal lobe evenly spaced, of about even width. Sauvage mentions three dark lower caudal bars, but his figure shows all the fins uniform and the body with four dark transverse bands. He includes in his table *U. taniopterus* with *U. vittatus*, as a group with eight dorsal rays, though Day, who examined Valenciennes type of the former gives but seven.

Compared with *Upeneoides arge* Jordan and Evermann,<sup>25</sup> my examples of the present species differ as the former has pale tipped dorsal and caudal markings different. Jordan and Seale describe as *U. vittatus* Samoan material<sup>26</sup> closely approaching my specimens and refer to it as uete or vete. Two adult examples of *U. vittatus* before me from Tahiti, though in poor condition, still have traces of the fin markings, more as indicated in Bleeker's figure, and with four dark bars on each caudal lobe. Smith and Seale report *U. vittatus*<sup>27</sup> from Mindanao  $4\frac{1}{2}$  to 11 inches long with "each lobe of caudal with 5 or 6 oblique dusky bars."

(For the Philippine Islands.)

***Upeneoides belaeque* sp. nov.** Fig. 16.

Head  $3\frac{1}{4}$ ; depth  $3\frac{1}{4}$ ; D. VIII-I, 8, 1; A. I, 6, 1; P. 1, 13; V. I, 5; scales 35 in lateral line to caudal base and 4 more on latter; 3 scales above l.l. to spinous dorsal origin, and 7 below to spinous anal origin; predorsal scales 17; head width 2 in its length; head depth at occiput  $1\frac{1}{4}$ ; snout  $2\frac{7}{8}$ ; eye 4; maxillary  $2\frac{1}{4}$ ; interorbital  $3\frac{1}{2}$ ; second dorsal spine  $1\frac{1}{4}$ ; first branched dorsal ray  $1\frac{7}{8}$ ; first branched anal ray  $1\frac{1}{4}$ ;

<sup>21</sup> Cat. F. Brit. Mus., I, 1859, p. 397.

—Journ. Mus. Godeffroy (F. Südsee) II, 1873-5, p. 55. Samoa and Tahiti.

<sup>22</sup> Atlas Ich. Ind. Néerl., IX, 1877, Pl. 342 (2), fig. 3.

<sup>23</sup> Fishes of India, I, 1875, p. 120, Pl. 30, fig. 2.

<sup>24</sup> Hist. Nat. Madagascar, Pisc., XVI, 1891, p. 219, Pl. 27, fig. 2.

<sup>25</sup> Bull. U. S. F. Com., XXII, 1902 (April 11, 1903), p. 187. Honolulu.

<sup>26</sup> Bull. Bur. Fisher., XXV, 1905 (1906), p. 273. Samoa.

<sup>27</sup> Proc. Biol. Soc. Wash., XIX, 1906, p. 78.



anal spine  $2\frac{2}{3}$ ; least depth of caudal peduncle  $2\frac{1}{2}$ ; upper caudal lobe 1; pectoral  $1\frac{1}{4}$ ; ventral  $1\frac{1}{2}$ .

Body elongate, compressed, profiles nearly alike and deepest at spinous dorsal origin. Caudal peduncle compressed, least depth  $1\frac{1}{2}$  its length.

Head moderately ovate in contour, well compressed, flattened sides scarcely converge above or below, profiles alike and upper little more inclined. Snout convex in profile and over surface, long as broad. Eye moderate, rounded, elevated close to upper profile, and hind pupil edge about midway in head length. Mouth moderate, inclined little from horizontal, and lower jaw slightly included in upper. Maxillary about reaches to pupil center, expansion  $1\frac{1}{2}$  in

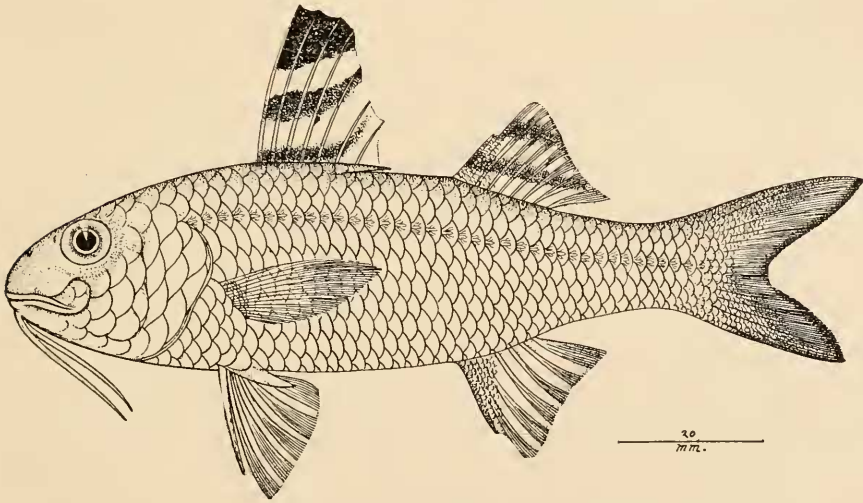


Fig. 16.—*Upeneoides belaque* sp. nov.

eye. Lips narrow, fleshy. Teeth granular in about 3 irregular rows in each jaw. Patch of granular teeth on vomer and each palatine. Inner buccal folds narrow. Tongue thick, fleshy, adnate. Mandible shallow and rami little elevated inside mouth. Barbels short, reach hind preopercle edge. Nostrils well separated, front one simple pore little nearer eye than snout tip, and hind one short slit close before middle of front eye edge. Interorbital slightly elevated convexly, flattened medially. Preorbital broad, width nearly equals eye. Preopercle edge entire. Opercle ends behind in 2 small close-set spines above, concealed by scales.

Gill-opening forward to front eye edge. Rakers 8+20, lanceolate,

slender,  $1\frac{1}{5}$  in filaments, and latter  $1\frac{1}{3}$  in eye. Pseudobranchiæ about  $\frac{2}{3}$  of gill-filaments. Isthmus moderately constricted.

Scales uniformly large, finely ctenoid, in lengthwise rows parallel with lateral line. Small scales over most of caudal base and front of soft dorsal and anal. Head scaly, and 2 rows of scales on cheek to preopercle ridge. Several large scales on exposed maxillary expansion. Pectoral with broad scale above its origin. Ventral with pointed axillary scale very slightly over half of fin length. Broad scaly flap (damaged) between ventral bases. Lateral line concurrent with dorsal profile, well out on caudal base, tubes well exposed as arborescent groupings at each scale base.

Spinous dorsal inserted about midway between front eye edge and second dorsal origin, first spine longest with second and third subequal, depressed fin  $\frac{7}{8}$  to second dorsal origin. Last inserted about midway between spinous dorsal origin and caudal base, first branched ray longest, with spine  $\frac{3}{5}$  length of first ray and depressed fin  $1\frac{1}{2}$  to caudal base. Anal origin slightly behind soft dorsal origin, fin similar. Caudal well forked, sharp pointed lobes about equal. Pectoral small, pointed, reaches about  $1\frac{1}{3}$  to second dorsal origin. Ventral origin about opposite pectoral origin, reaches  $1\frac{7}{8}$  to anal. Ventral spine about  $\frac{4}{5}$  of fin.

Color in alcohol faded largely dull uniform brownish, lower surfaces whitish. Fins all pale, at least ground-color. Spinous dorsal with broad black apex, two dusky horizontal bands, and penultimate membrane dusky. Soft dorsal with upper edge dusky and two pale dusky horizontal bands. Caudal uniform pale brownish, hind edge pale dusky. Iris pale slaty.

Length 120 mm.

Type, No. 47,512, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also Nos. 47,513 to 47,517, paratypes, same data. They show: Head 3 to  $3\frac{1}{4}$ ; depth 3 to  $3\frac{4}{5}$ ; D. VIII-I, 8, 1; A. I, 6, 1, rarely I, 7, 1; scales 32 to 35 in l.l. to caudal base and 3 or 4 more on latter; 3 scales above l.l., and 7 below; 16 or 17 predorsal scales; snout  $2\frac{1}{2}$  to 3 in head; eye  $3\frac{1}{2}$  to 4; maxillary  $2\frac{1}{6}$  to  $2\frac{1}{2}$ ; interorbital  $3\frac{1}{2}$  to  $3\frac{4}{5}$ ; rakers 8 or 9 + 19 to 22; length 69 to 140 mm.

Allied with *Upeneoides sulphureus* but when compared with Sumatran material differs in coloration and more numerous gill-rakers. *U. sulphureus* has but one horizontal dark band on each dorsal besides dark end or border.

(*Belaque*, the native name of the allied *U. sulphureus* at San Fabian, P. I.)

**Argyrosomus goldmani** (Bleeker).

Small example and two adults which agree with Bleeker's figure, especially in length of second anal spine. My examples show latter  $2\frac{4}{5}$  in head, and jaws about even when closed.

**Sciaena dussumieri** (Valenciennes).

Several examples. Contrary to the contention by Jordan and Thompson<sup>28</sup> that the "substitution of *Sciaena* for *Umbrina* by Bleeker is not warranted by the rules of the International Zoological Congress" in my opinion the type of a genus must be a species originally included in the genus under its distinct original binomial. As Gill designated *S. aquila* Cuvier the type of *Sciaena* Cuvier<sup>29</sup> which evidently was the *Cheilodipterus aquila* previously described by Lacépède and therefore definitely indicated a species not recognized by Linnæus or named in his original account, Gill's action is invalid. The first actual designation of *Sciaena cirrhosa* Linnæus as the type of *Sciaena* Linnæus, by Bleeker,<sup>30</sup> correctly argues that *Sciaena* supersede *Umbrina*, and the designation of *Sciaena umbra* by Jordan and others<sup>31</sup> is invalid.

**Polydactylus plebius** (Broussonet).

Three examples. Jordan and Evermann are wrong<sup>32</sup> in attempting to fix *Polynemus paradiseus* Linnæus as the type of *Polynemus* Linnæus, as Gill designates *Polynemus quinquarius* Linnæus<sup>33</sup> many years before 1883. *Polydactylus* will therefore remain the correct generic name for the present species.

**Pomacentrus violescens** Bleeker.

Four examples, which agree in the squamation and general coloration as shown by Bleeker. He gives the pectorals as clear violaceous with their bases commonly with a spot or transverse blackish or dusky streak. *P. philippinus* Evermann and Seale is very closely allied, if not identical. It is figured with 3 rows of scales on the cheek, the lowest on the preopercle limb. Its teeth are said to be small and uniserial.

<sup>28</sup> Proc. U. S. Nat. Mus., XXXIX, 1911, p. 246.

<sup>29</sup> Proc. Acad. Nat. Sci. Phila., 1861, p. 82.

<sup>30</sup> Arch. Néerl. Sci. Nat. Harlem, XI, 1876, p. 326.

<sup>31</sup> Stanford Univ. Pub. (Genera of Fishes), 1917, p. 13.

<sup>32</sup> L. c., p. 15.

<sup>33</sup> Proc. Acad. Nat. Sci. Phila., 1861, p. 273.

*Pomacentrus grammorhynchus* sp. nov. Fig. 17.

Head  $3\frac{2}{3}$ ; depth  $1\frac{5}{6}$ ; D. XIII, 15, 1; A. II, 15, 1; P. II, 16, II; V. I, 5; tubes in upper arch of lateral line 18, and pores in straight section to caudal base 9; 3 scales between spinous dorsal origin and lateral line, and 10 below l.l. to spinous anal origin; 23 predorsal scales; head width  $1\frac{2}{5}$  in its length; head depth about  $1\frac{1}{8}$ ; snout 3; maxillary  $3\frac{3}{4}$ ; interorbital  $2\frac{1}{2}$ ; first dorsal spine nearly 4; thirteenth dorsal spine  $1\frac{1}{5}$ ; eighth dorsal ray  $1\frac{2}{5}$ ; second anal spine 2; sixth anal ray  $1\frac{4}{5}$ ; least depth of caudal peduncle  $1\frac{7}{8}$ ; ventral spine  $1\frac{3}{4}$ .

Body robust, compressed, contour rather deeply ellipsoid, with

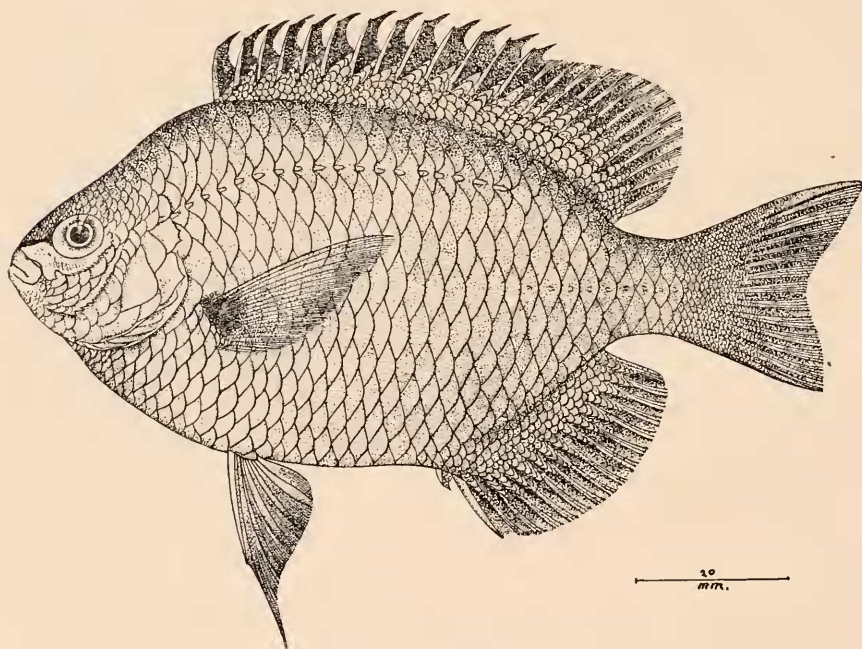


Fig. 17.—*Pomacentrus grammorhynchus* sp. nov.

greatest depth well over median region, predorsal slightly trenchant just before dorsal, otherwise edges convex, and profiles alike. Caudal peduncle compressed, length  $\frac{3}{5}$  its least depth.

Head robust, moderately compressed, sides moderately convex, upper profile at first convex, then concave at occipital and predorsal bulging distinctly convexly. Snout convex over surface and in profile, length half its width. Eye rounded, little elevated, and hind pupil edge nearly midway in head length. Mouth broad, gape short, oblique, and jaws about even. Lips fleshy, rather

narrow. Maxillary extends slightly beyond nostril, though not nearly to eye, and slips below preorbital. Teeth rather slender, somewhat compressed, pointed, crowded close to form an even cutting-edge in a single row. No teeth on mouth roof or on tongue. Inner buccal folds broad. Tongue thick, fleshy, apparently free in front. Nostril small pore about midway in snout length. Interorbital evenly convex. Preorbital broad, width about  $1\frac{3}{4}$  in eye, ends behind in broad posteriorly directed spine. Lower suborbital and hind preopercle edges serrate, serræ on latter graduated longer below, and lower preopercle edge entire. Opercle with 2 blunt and inconspicuous spines, upper concealed by scales.

Gill-opening forward about opposite front eye edge. Rakers  $6+13$ , lanceolate, about half length of filaments and latter  $1\frac{1}{4}$  in eye. Pseudobranchiæ long as gill-filaments. Branchiostegal membrane short fold over short and constricted isthmus.

Scales finely ctenoid, largest over middle of side of trunk and become much smaller all about edges, in lengthwise rows parallel with upper arch of lateral line. All larger scales narrowly imbricated. All fin bases scaly. Short scale between ventral bases about  $\frac{1}{4}$  length of spine. Suprascapula with 3 blunt points. Exposure of humeral scale little larger than pupil. Axillary ventral scale broad, pointed,  $\frac{1}{4}$  length of spine. Cheek with 3 rows of scales. Suborbitals, preorbital, snout edge, lips and chin naked. Upper arch of l.l. extends below front dorsal rays, concurrent with upper limit of squamation on dorsals. Tubes large, simple, and each extending well over scale exposure. Pores in straight section small, inconspicuous, simple or double irregularly, and not on caudal base.

Spinous dorsal origin about opposite that of pectoral, spines all more or less subequally high, edge of fin notched and slight cutaneous flap behind each spine tip. Soft dorsal inserted about last third in space between upper hind preopercle edge and caudal base, fin rounded with median rays longest. Anal inserted about midway between pectoral origin and caudal base, first spine about  $\frac{1}{3}$  of second. Soft anal similar to soft dorsal. Caudal deeply emarginate, upper lobe much larger,  $3\frac{1}{8}$  in combined head and trunk. Pectoral broad, about long as upper caudal lobe, reaches hind edge of vent and upper rays longest. Ventral inserted close behind pectoral base, reaches anal, and spine slightly over half length of fin.

Color in alcohol largely chocolate-brown above and posteriorly, head, breast and belly anteriorly paler or faded in appearance. Iris slaty. Dorsals and anals blackish-brown. Caudal pale brown-



ish. Pectoral brownish, with large blackish-brown blotch, nearly large as eye on base mostly above. Ventral blackish-brown, rays and spine pale. Dusky line from snout tip to eye.

Length 115 mm.

Type, No. 47,518, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Allied with *P. melanopterus* Bleeker, but differs in the presence of the dark line from the eye to the snout.

(Γραμμή, line; ρόγχος, snout.)

*Pomacentrus hebarði* sp. nov. Fig. 18.

Head 3; depth 2; D. XIII, 14, 1; A. II, 13, 1; P. II, 15; V. I, 5; tubes 17 in upper arch of lateral line and 8? pores in straight section to caudal base; 3 scales above l.l. to spinous dorsal origin and 9 below in vertical series to anal origin; 20 predorsal scales; head width  $1\frac{4}{5}$  its length; head depth 1; snout  $3\frac{2}{5}$ ; eye  $2\frac{4}{5}$ ; maxillary  $3\frac{1}{3}$ ; interorbital  $2\frac{2}{5}$ ; last dorsal spine  $2\frac{1}{3}$ ; second anal spine 2; eleventh dorsal ray 2?; ninth anal ray  $1\frac{4}{5}$ ; pectoral  $1\frac{1}{8}$ ; ventral spine 2; least depth of caudal peduncle  $2\frac{1}{5}$ ; caudal 1.

Body well compressed, contour evenly and elongately ellipsoid, deepest medianly, and edges convexly rounded. Caudal peduncle compressed, length about  $\frac{3}{5}$  its least depth.

Head compressed, moderately large, rather flattened sides evenly converging above and below. Snout rather broad, slightly convex in profile and evenly so over surface, and length  $\frac{3}{4}$  its width. Eye rounded, little elevated, and hind pupil edge nearly midway in head length. Mouth small, short gape oblique, and lower jaw very slightly protruded. Lips moderate, fleshy. Maxillary extends back nearly opposite front eye edge. Teeth small, simple, compressed, rather obtuse and form as crowded in a single series nearly even cutting-edge. No teeth on mouth roof. Tongue pointed, depressed and smooth above, free in front. Inner buccal folds broad. Mandibular rami moderately elevated inside mouth. Nostril simple pore slightly behind middle in snout length. Interorbital slightly convex. Pre-orbital width  $2\frac{1}{4}$  in eye, with broad flat short spine directed back from hind edge. Suborbital edge with few irregular serræ below. Preopercle edge obliquely forward not quite opposite eye center, and 18 irregular serræ behind, though graduated larger downwards, and lower edge entire. Opercle with 2 obtuse short spines.

Gill-opening forward about opposite last  $\frac{2}{3}$  in eye. Rakers 6+13, lanceolate, slightly shorter than filaments, which 2 in eye. Pseudo-

branchiæ a little shorter than gill-filaments. Branchiostegal membrane moderately free over short constricted isthmus.

Scales finely ctenoid, narrowly imbricated, in even lengthwise rows, smaller along body edges, and at fin bases. Vertical fins covered basally with small scales. Suprascapula entire. Cheek with 3 rows of scales and lowest row on preopercle limb. Lips, chin, pre-orbital, suborbitals and snout edge narrowly, naked. Scales on snout above and top of head all small. Upper arch of lateral line

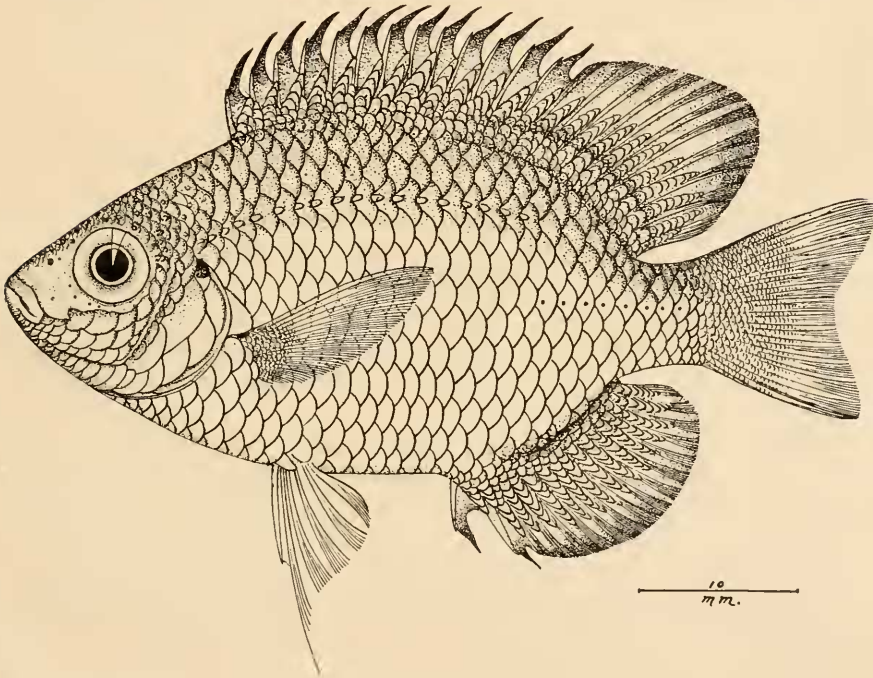


Fig. 18.—*Pomacentrus hebardii* sp. nov.

concurrent with limit of general squamation on dorsals, and extends back opposite soft dorsal origin. Tubes simple, large, extend over first half in each scale exposure. Pores in straight section simple, inconspicuous, and not on caudal base.

Spinous dorsal origin opposite pectoral origin, spines graduated up to fourth when largely subequal to last, fin edge notched and with cutaneous flap behind each spine tip. Soft dorsal origin at last third in space between hind eye edge and caudal base, and hind median rays longest. Spinous anal midway between pectoral origin and

caudal base, first spine about half length of second. Soft anal like soft dorsal. Caudal moderately emarginate behind. Pectoral long, about reaches anal. Ventral inserted close behind pectoral base, first ray ends in filament reaching second anal spine base. Vent close before anal.

Color in alcohol largely uniform brownish above, much paler below. Fins all largely pale, though marginal portions of spinous dorsal and anal dusky. Caudal pale to whitish. Very small dusky spot on uppermost scale of opercle. Another dusky spot, similar and about half size of pupil, at uppermost pectoral ray basally and above. Vent dusky. Iris slaty.

Length 56 mm.

Type, No. 47,519, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also Nos. 47,520 to 47,525, paratypes, same data. These show: Head 3 to  $3\frac{1}{8}$ ; depth  $1\frac{3}{4}$  to 2; D. XIII, 13, 1 occasionally XIII, 14, 1 or XIII, 15, 1; A. II, 14, 1 sometimes II, 12, 1 or II, 13, 1; tubes in upper arch of l.l. 17, vary 14, 15 and 16; pores in straight section of l.l. 8; snout  $3\frac{1}{8}$  to  $3\frac{3}{4}$  in head; eye  $2\frac{1}{2}$  to  $2\frac{3}{5}$ ; maxillary  $2\frac{2}{3}$  to 3; interorbital  $2\frac{3}{4}$  to  $3\frac{1}{8}$ ; length 43 to 54 mm. In these examples dusky vent quite characteristic.

Similar to *Pomacentrus moluccensis* Bleeker, but without a pale lengthwise line across anals, as shown in Bleeker's figure.<sup>34</sup> The latter also does not indicate a suborbital spine, which well developed in all of my examples.

(Named for Mr. Morgan Hebard of Philadelphia, an earnest student of Orthoptera, to whom I am indebted for small collections of fishes.)

***Pomacentrus burroughi* sp. nov. Fig. 19.**

Head  $3\frac{3}{8}$ ; depth 2; D. XIII, 14, 1; A. II, 15, 1; P. II, 15; V. I, 5; tubes 13 in upper arch of lateral line, and 10 pores in straight section to caudal base; 3 scales above l.l. to spinous dorsal origin, and 9 below in vertical series to spinous anal origin; 20 predorsal scales; head width  $1\frac{1}{2}$  in its length; head depth 1; snout  $3\frac{1}{2}$ ; eye  $3\frac{1}{2}$ ; maxillary  $3\frac{2}{5}$ ; interorbitals 3; last dorsal spine  $1\frac{2}{3}$ ; second anal spine  $1\frac{7}{8}$ ; fifth dorsal ray  $1\frac{1}{4}$ ; eighth anal ray  $1\frac{1}{2}$ ; pectoral 1; ventral spine  $1\frac{4}{5}$ ; least depth of caudal peduncle 2; caudal about 1.

Body well compressed, contour rather deeply ellipsoid with greatest

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<sup>34</sup> Atlas Ich. Ind. Néerl., IX, 1877, Pl. 3, fig. 3.

depth medianly, profiles alike, and edges convexly rounded. Caudal peduncle compressed, length about half its least depth.

Head compressed, rather small, rather flattened sides evenly converge above and below. Snout broad, convex, length  $\frac{2}{3}$  its width. Eye rounded, little elevated, hind pupil edge about midway in head length. Mouth small, short gape slightly oblique, and jaws nearly even or with lower very slightly included. Lips rather narrow, fleshy. Maxillary extends back to eye. Teeth small, simple, compressed, pointed, crowded to form rather even cutting-edge,

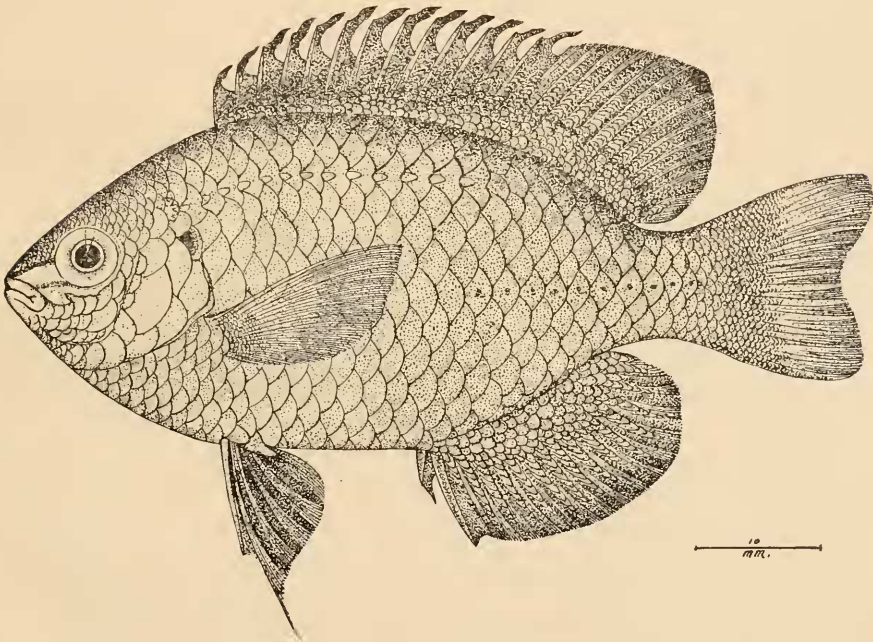


Fig. 19.—*Pomacentrus burroughi* sp. nov.

and in single series. No teeth on mouth roof. Tongue thick, pointed and free in front, smooth. Inner buccal folds broad. Mandibular rami rather well elevated inside mouth. Nostril simple pore slightly behind middle in snout length. Interorbital evenly convex. Preorbital width  $2\frac{1}{5}$  in eye, slips over upper maxillary edge, and with broad backwardly directed spine below at hind edge. Suborbital edge finely serrate below. Preopercle edge slopes forward with 19 serræ behind, lower edge entire. Opercle with 2 blunt points.

Gill-opening forward opposite front pupil edge. Rakers 6+10,



lanceolate, nearly long as filaments and latter half of eye. Pseudo-branchiæ long as gill-filaments. Branchiostegal membrane narrowly over narrow short constricted isthmus.

Scales finely ctenoid, narrowly imbricated, in even lengthwise rows, smaller along body edges except breast and caudal peduncle above and below. Vertical fins with at least basal half covered with fine crowded scales. Suprascapula entire. Cheek with 2 rows of scales. Lips, preorbital, suborbitals, edge of snout narrowly, and chin, naked. Upper arch of lateral line concurrent with limit of general squamation on dorsals, and extends back to soft dorsal origin. Tubes simple, large, and each well over scale exposure, last nearly to edge. Pores in straight section simple, inconspicuous, one in center of each scale exposure, and not on caudal base.

Spinous dorsal origin opposite that of pectoral, spines graduated up to fourth, after which subequally long to last, and fin edge notched, also cutaneous point behind each spine tip. Soft dorsal inserted nearly at last third in space between upper hind preopercle edge and caudal base, fin rounded, with median rays longest. Spinous anal inserted much nearer pectoral origin than caudal base, first spine nearly  $\frac{1}{3}$  of second. Soft anal like soft dorsal. Caudal slightly emarginate, and lobes rounded. Pectoral moderate, not quite reaching anal, though slightly beyond vent. Ventral inserted below hind pectoral base, reaches anal, first ray with slender filamentous tip, and spine half length of fin. Vent close before anal.

Color in alcohol uniform chocolate-brown generally, scarcely paler below. Fins also same general tint, except darker or mostly dusky, pectoral paler, and caudal still more so. Narrow obsolete dark line connects eyes around front of snout, including nostrils in its course. Uppermost opercular scale with conspicuous black blotch, though smaller than pupil. Inner pectoral axil brown, though at base of uppermost ray small black spot, smaller than spot on opercular scale.

Length 70 mm.

Type, No. 47,526, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also No. 47,527, paratype, same data. Head 3; depth 2; D. XIII, 14; A. II, 14; upper arch of l.l. with 16 tubes and straight portion of 9 pores to caudal base; snout  $3\frac{1}{2}$  in head; eye  $2\frac{3}{4}$ ; maxillary  $3\frac{1}{8}$ ; interorbital  $3\frac{1}{8}$ ; length 57 mm.

Allied with *P. tripunctatus* Cuvier, but differs in the absence of the



black ocellus on the back of the tail, which Jordan and Seale state is apparently a distinctive character.<sup>35</sup> Bleeker gives six figures, though none exactly agree with my material.<sup>36</sup>

(For Dr. Marmaduke Burrough, 1798?–1844, who obtained fishes at Manila, which found their way to the Academy collection.)

*Pomacentrus opisthostigma* sp. nov. Fig. 20.

Head  $3\frac{1}{8}$ ; depth  $1\frac{7}{8}$ ; D. XIV, 12, 1; A. II, 15, 1; P. II, 15; V. I, 5; tubes 15 in upper arch of lateral line and 10 pores in straight section to caudal base; 4 scales above l.l. to spinous dorsal origin, and 10

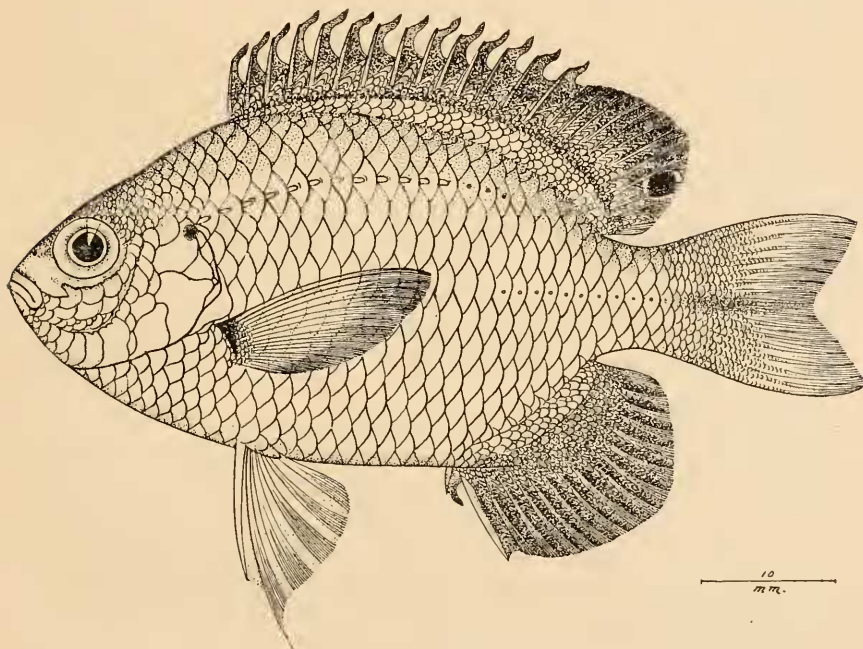


Fig. 20.—*Pomacentrus opisthostigma* sp. nov.

below in vertical series to spinous anal origin; 22 predorsal scales; head width  $1\frac{2}{3}$  in its length; head depth 1; snout  $3\frac{1}{8}$ ; eye  $3\frac{1}{8}$ ; maxillary  $3\frac{1}{3}$ ; interorbital  $2\frac{4}{5}$ ; last dorsal spine 2 in head; second anal spine  $1\frac{4}{5}$ ; sixth dorsal ray  $1\frac{3}{4}$ ; eighth anal ray  $1\frac{2}{3}$ ; pectoral 1; ventral spine  $1\frac{2}{5}$ ; least depth of caudal peduncle  $2\frac{1}{8}$ ; caudal about 1?.

Body well compressed, contour rather deeply ellipsoid with greatest depth medianly, profiles largely alike except slightly humped pre-

<sup>35</sup> Bull. Bur. Fisher., XXV, 1905 (1906), p. 281.

<sup>36</sup> Atlas Ich. Ind. Néerl., IX, 1877, Pl. 7, figs. 1–6.

dorsal, and edges convexly rounded. Caudal peduncle compressed, length about  $\frac{2}{3}$  its least depth.

Head compressed, moderate, rather flattened sides evenly converging above and below. Snout wide, profile about straight, surface convex, and length  $\frac{3}{4}$  its width. Eye rounded, little elevated, hind pupil edge nearly midway in head length. Mouth small, short gape slightly oblique, and jaws about even. Lips rather narrow, fleshy. Maxillary extends back nearly opposite eye. Teeth small, simple, compressed, but little pointed, crowded to form nearly even cutting-edge in single row. No teeth on mouth roof. Tongue thick, pointed, free in front, smooth. Inner buccal folds broad. Mandibular rami rather well elevated inside mouth. Nostril simple pore slightly behind middle in snout length. Interorbital convex. Preorbital width 2 in eye, slips over most of upper maxillary edge, and hind edge with 2 short spines directed back. Suborbital edge finely serrate below. Preopercle edge obliquely forward not quite opposite eye center, finely serrate except several broader serræ at lower portion, and lower edge entire. Opercle with 2 short blunt points.

Gill-opening forward opposite front pupil edge. Rakers 8+15, lanceolate, longest  $\frac{7}{8}$  of filaments, which  $1\frac{1}{2}$  in eye. Pseudobranchiæ long as gill-filaments. Branchiostegal membrane narrowly over short constricted isthmus.

Scales finely ctenoid, narrowly imbricated, in even lengthwise rows, smaller along body edges and fin bases. Vertical fins finely and closely scaled over basal portions. Suprascapula entire. Cheek with 3 rows of scales. Lips, chin, preorbital, suborbitals and narrow edge of snout naked. Scales on snout above and top of head all small. Upper arch of lateral line concurrent with limit of general squamation on dorsals, extends back opposite twelfth dorsal spine base, though follow by 3 more pores till below front of soft dorsal. Tubes simple, large, well exposed or over first half of scale exposure. Pores in straight section simple, inconspicuous, one in center of each scale exposure, and not on caudal base.

Spinous dorsal origin opposite that of pectoral, spines graduated up to fourth, after which subequally long to last, and fin edge notched with cutaneous flap from behind each spine tip. Soft dorsal inserted at last third between suprascapula and caudal base, fin rounded, with median rays longest. Spinous anal inserted about midway between pectoral origin and caudal base, first spine nearly  $\frac{2}{5}$  of second. Soft anal like soft dorsal. Caudal a little emarginate

behind. Pectoral moderate, reaches  $\frac{7}{8}$  to anal or about opposite vent. Ventral inserted just behind pectoral base and reaches vent, spine  $\frac{2}{3}$  of fin. Vent close before anal.

Color in alcohol brownish generally, paler on belly and lower surface of head. Dorsals and anals deep brown to dusky. Last longest rays of soft dorsal with large black ocellus, not quite large as eye, on terminal portion of fin. Caudal, pectoral and ventral pale brownish. Pectoral axil pale, though external base with blackish-brown vertical wedge-shaped mark on upper portion. Uppermost opercular scale with dusky blotch, much smaller than pupil. Iris slaty.

Length 65 mm. (caudal tips slightly damaged).

Type, No. 47,528, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also Nos. 47,529 and 47,530, paratypes, same data. These show: Head  $2\frac{7}{8}$  to  $3\frac{1}{8}$ ; depth 2; D. XIV, 13 or XIV, 14; A. II, 15; tubes in upper arch of l.l. 16 and pores in straight section 10 to 12 to caudal base; snout 3 to  $3\frac{7}{8}$  in head; eye  $2\frac{7}{8}$  to 3; maxillary 3 to  $3\frac{1}{8}$ ; interorbital 3 to  $3\frac{1}{4}$ ; length 41 to 61 mm. All show ocellus on soft dorsal well developed, but preorbital spines very variable, and they may be single or double, even in the same individual.

Apparently unique in its coloration this species is characterized by the large black ocellus behind and terminally on soft dorsal. With the preceding three species this one appears to fall in Bleeker's subgenus *Pseudopomacentrus*.

("Οπισθον, rear; σπιγμα, spot.)

***Pomacentrus lividus* (Forster).**

Two small examples which do not show any scales on the lower limb of the preopercle, as in Bleeker's figure, and only 2 rows occur on the cheek.

***Cheiloprion labiatus* (Day).**

Two examples. Weber figures the head from his single example<sup>37</sup> and though his text says the scales on the cheek are in  $2\frac{1}{2}$  to 3 rows his figure shows 6 or 7. The former numbers are more in agreement with Day's figure, which is called *Pomacentrus labiosus*.<sup>38</sup>

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<sup>37</sup> Siboga Exped. Fische, 1913, p. 342, fig. 73. Beo, Karakelomg I.

<sup>38</sup> Fishes of India, III, 1877, Pl. 81, fig. 2.

**Abudefduf antjerius** (Cuvier).

Two, which agree as outlined by Bleeker in his limits of color-variation, with reference to the dorsal ocellus absent or at dorsal base behind and diffusely dusky.

**Abudefduf philippinus** sp. nov. Fig. 21.

Head  $2\frac{4}{5}$ ; depth  $1\frac{4}{5}$ ; D. XIII, 11; A. II, 12; P. I, 14; V. I, 5; tubes in upper part of lateral line 17, and pores in straight section 7; 3 scales above lateral line to spinous dorsal origin and about 8 scales below in vertical row to spinous anal origin; about 14 predorsal

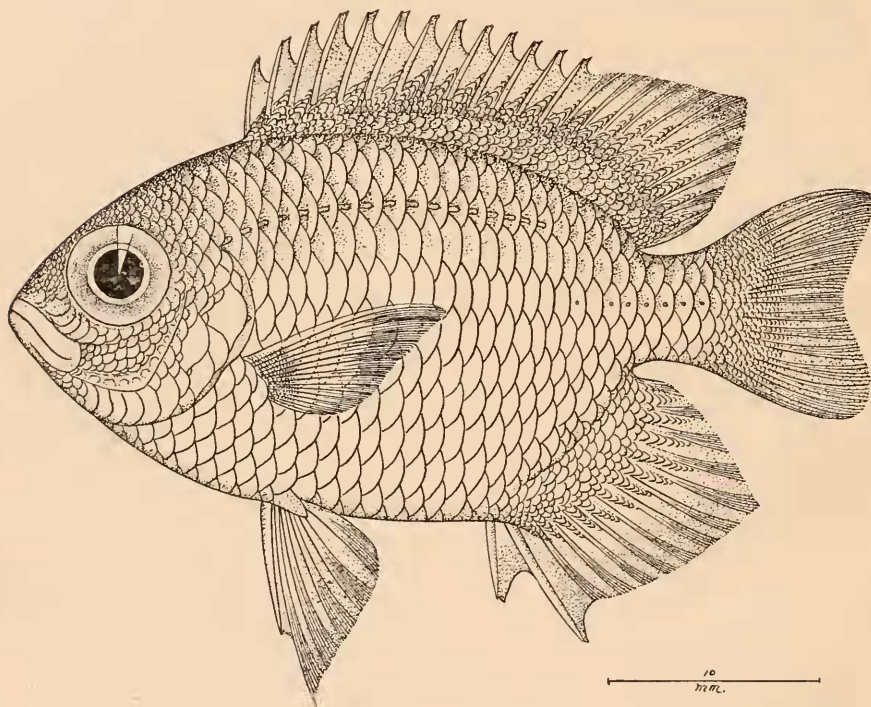


Fig. 21.—*Abudefduf philippinus* sp. nov.

scales; head width  $1\frac{2}{3}$  its length; head depth 1; snout  $3\frac{1}{4}$ ; eye  $2\frac{1}{4}$ ; maxillary  $3\frac{1}{5}$ ; interorbital  $2\frac{3}{4}$ ; third dorsal spine 2; thirteenth dorsal spine  $2\frac{1}{6}$ ; fifth dorsal ray  $1\frac{2}{5}$ ?; second anal spine  $1\frac{2}{5}$ ; fifth anal ray  $1\frac{2}{5}$ ; least depth of caudal peduncle  $2\frac{1}{5}$ ; caudal  $1\frac{1}{5}$ ; pectoral  $1\frac{1}{5}$ ; ventral  $1\frac{1}{10}$ .

Body well compressed, contour orbicular, deepest midway in length, predorsal with slight median keel and other edges convexly rounded. Caudal peduncle compressed, length  $1\frac{1}{2}$  in its least depth.



Head moderate, well compressed, evenly constricted above and below, profiles similarly inclined. Snout convex over surface, very slightly so in profile, length  $\frac{2}{3}$  its width. Eye large, close to upper profile, and hind pupil edge nearly midway in head length. Mouth well inclined, gape moderate, and jaws about even. Maxillary extends back slightly beyond front eye edge, though not quite to that of pupil, upper edge entirely slips below preorbital. Row of moderate, even, rather crowded, compressed incisors in each jaw, end of each tooth truncate, and whole forms even cutting-edge. No teeth on tongue or mouth roof. Tongue depressed, pointed, free. Inner buccal folds broad. Lips fleshy, moderately wide. Nostril slightly behind middle in snout length. Interorbital convex. Preorbital width  $3\frac{1}{4}$  in eye. Hind preopercle edge slopes well forward, so that angle would fall nearly opposite center of eye, and like lower preorbital and suborbital edges, entire.

Gill-opening forward opposite front pupil edge. Rakers 7+16, lanceolate, longest about long as gill-filaments or 3 in eye. Pseudo-branchiæ slightly longer than gill-filaments. Isthmus narrowly constricted, trenchant, branchiostegal membrane moderately broad across.

Scales finely ctenoid, narrowly imbricated, in even lengthwise rows, smaller along body edges. Fins all scaly basally. Suprascapula thin, entire, small. Cheek with 4 rows of scales. Opercle with moderate scales, small on interorbital, and still smaller on upper part of snout. Moderate scales on suborbitals and preorbital. Chin, lips, and narrow strip on front of snout naked, though mandible scaly. Scaly ventral flaps damaged. Lateral line with upper branch curving up at first, and then largely concurrent with upper limit of general squamation on dorsal fins, and ends below soft dorsal origin. Tubes simple, large, extend nearly over first half in scale exposure. Pores in horizontal section inconspicuous, small, and one in middle of each scale exposure, not on caudal base.

Spinous dorsal inserted opposite pectoral origin, spines rapidly graduated up to third, then subequal, fin edge well notched. Soft dorsal origin nearly at last third between upper hind preopercle edge and caudal base, rays graduated up to sixth and seventh, which form sharp point behind. Spinous anal inserted well before soft dorsal, first spine about 3 in second, or fin origin nearly midway between ventral origin and caudal base. Soft anal like soft dorsal. Caudal (damaged) apparently little emarginate behind. Pectoral reaches anal. Ventral inserted below middle of pectoral base,



nearly reaches soft anal origin, and spine nearly  $\frac{3}{4}$  fin length. Vent close before anal.

Color in alcohol largely faded dull brownish generally, predorsal, head above and front of back with traces of darker mottlings. Fins all pale uniform brownish. Iris slaty.

Length 41 mm. (caudal tip damaged).

Type, No. 47,531, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

No. 47,532, paratype, same data. It shows: Head  $2\frac{4}{5}$ ; depth  $1\frac{4}{5}$ ; D. XIII, 11; A. II, 12; tubes in upper arch of l.l. 17 and pores in straight portion 7; snout  $3\frac{7}{8}$  in head; eye 2; maxillary 3; interorbital  $2\frac{3}{4}$ ; length 36 mm.

Apparently falls within the subgenus *Amblyglyphidodon* Bleeker, and without much in common with the four East Indian species Bleeker describes.

**Abudehduf parasema** sp. nov. Fig. 22.

Head  $3\frac{1}{6}$ ; depth  $2\frac{1}{8}$ ; D. XIII, 11, 1; A. II, 12, 1; P. II, 13; V. I, 5; tubes in upper arch of lateral line 13, followed by oblique row of 4 pores and finally 8 pores in horizontal section to caudal base; 2 scales above l.l. and spinous dorsal origin, and 9 below in vertical series to spinous anal origin; 15 predorsal scales; head width  $1\frac{2}{3}$  in its length; head depth at hind eye edge 1; snout  $3\frac{3}{4}$ ; eye  $2\frac{3}{4}$ ; maxillary  $2\frac{4}{5}$ ; interorbital  $2\frac{4}{5}$ ; fifth dorsal spine 2; third dorsal ray  $1\frac{3}{5}$ ; second anal spine  $1\frac{3}{5}$ ; third anal ray  $1\frac{1}{3}$ ; least depth of caudal peduncle  $2\frac{1}{10}$ ; caudal (damaged)  $1\frac{1}{4}$ ?; pectoral  $1\frac{1}{5}$ ; ventral spine  $1\frac{3}{4}$ .

Body well compressed, profiles evenly convex to form even ellipsoid contour, edges rounded, and greatest depth midway in length. Caudal peduncle compressed, length  $\frac{3}{4}$  its least depth.

Head moderately large, well compressed, flattened sides evenly and slightly constricted above and below, profiles alike. Snout slightly convex in profile, surface also convex, length  $\frac{3}{5}$  its width. Eye large, rounded, little elevated, well advanced. Mouth small, jaws about even. Maxillary small, reaches very slightly beyond front eye edge. Lips thin, narrow. Teeth small, uniserial, ends truncate. Inner buccal folds narrow. Tongue pointed, free, depressed. Nostril at last third in snout, simple pore with slight cutaneous rim. Interorbital convex. Preorbital width about 3 in eye, deeply notched but entire along edge. Preopercle edge entire and slopes forward about opposite hind eye edge.

Gill-opening forward about opposite front pupil edge. Rakers  $4+16$ , lanceolate, slender, about long as filaments or  $2\frac{1}{2}$  in eye. Pseudobranchiae about long as gill-filaments. Isthmus narrowly constricted, short.

Scales ctenoid, narrowly imbricated, in even lengthwise rows, little smaller along body rows. Fins all scaly basally. Suprascapula thin, entire. Cheek with 2 rows of scales. Scales on opercles moderate, small on top of head. Lips, snout broadly, preorbital and suborbitals naked. Broad scaly flap between ventral bases about half length of fin. Ventral axilla with small pointed scale

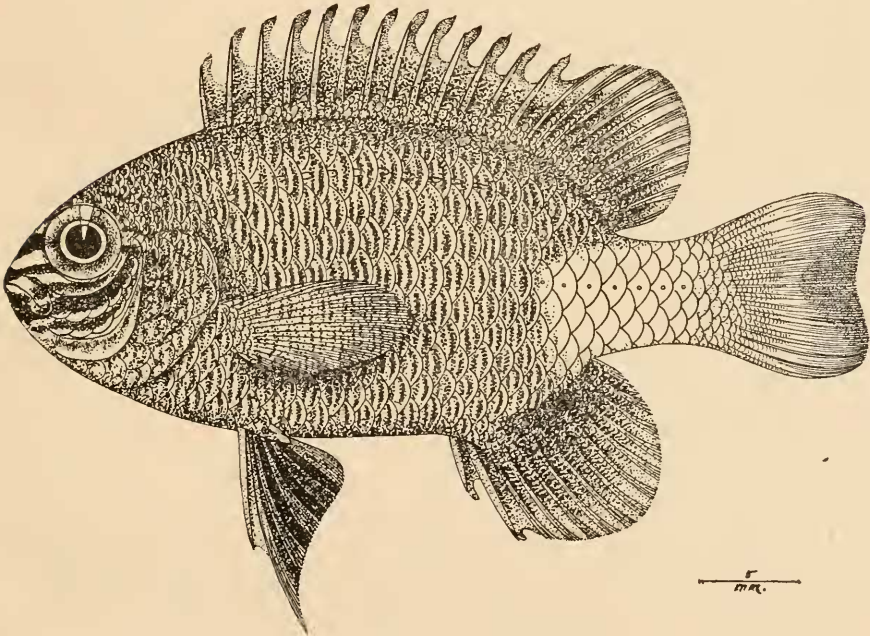


Fig. 22.—*Abudedefduf parasema* sp. nov.

about 3 in spine. Height of large humeral scale equals  $\frac{2}{3}$  of eye-diameter. Lateral line with upper branch curving up at first and then follows concurrently along back with upper limits of general squamation, though continues as several simple pores to caudal peduncle. Pores in horizontal section small, inconspicuous and one in middle of each scale exposure, not on caudal base.

Spinous dorsal inserted opposite pectoral origin, spines graduated up to fifth, then subequal, fin edge well notched and slight cutaneous point behind each spine tip. Soft dorsal origin at last third between

spinous dorsal origin and caudal base, rays graduated to fourth which longest. Spinous anal origin little nearer pectoral origin than caudal base, first spine about  $\frac{2}{5}$  of second. Soft anal graduated to fifth or longest ray, fin pointed behind like soft dorsal. Caudal small (damaged) and apparently rounded. Pectoral moderate, rather broad, nearly reaches anal. Ventral inserted close behind pectoral base, fin to second anal spine base, and fin length 3 in combined head and trunk length. Vent close before anal.

Color in alcohol deep chocolate-brown, caudal peduncle and caudal fin white in contrast. Vertical fin dusky-brown. Muzzle with 4 oblique dusky-chocolate streaks. Dark bar at pectoral origin and base. Each scale with dark blotch on head and dark vertical bar on each larger scale on trunk. Iris pale slaty. Hind caudal edge with moderately broad pale brown shade. Teeth pale.

Length 43 mm.

Type, No. 47,533, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also, Nos. 47,534 to 47,537, paratypes, same data. These show: Head 3 to  $3\frac{1}{8}$ ; depth 2; D. XIII, 11, 1; A. II, 12, 1; scales 13 to 15 with tubes, then 3 or 4 pores, and finally 8 or 9 pores in horizontal section of lateral line; 2 or 3 scales above l.l. and 8 or 9 below; 17 to 19 predorsal scales; snout  $3\frac{1}{3}$  to  $3\frac{3}{4}$  in head; eye  $2\frac{2}{3}$  to 3; maxillary 3 to  $3\frac{3}{4}$ ; interorbital  $2\frac{1}{2}$  to  $2\frac{7}{8}$ ; length 37 to 43 mm.

Related to *Glyphidodon lacrymatus* Quoy and Gaimard,<sup>39</sup> which differs in coloration, the figure without black pectoral blotch and caudal only slightly paler or about same tint as pectoral. *G. lacrymatus* also shows scattered and rather large obscure bluish spots on back. *Abudefduf sapphirus* Jordan and Richardson has somewhat similar head markings, but has the tail and caudal peduncle like rest of body.

(Παράσκημα, streamer, with reference to the pale tail.)

CTENOGLYPHIDODON subgen. nov.

Type *Abudefduf melanopselion* sp. nov.

Body of oblong contour. Preorbital broad, with entire edge. Hind preopercle edge entire. Gill-rakers very long and slender, also numerous or about 76 on first arch. Front border of snout, or space before nostrils, naked. Preorbitals and suborbitals scaleless. Of three rows of scales on cheek lowest row on preopercle limb.

<sup>39</sup> Voy. Uranie, Zool., 1825, p. 388, Pl. 22, fig. 7.

This subgenus appears unique in its very fine and numerous gill-rakers.

(*Κτεῖς*, comb; *Glyphidodon*, an old name for *Abudefduf*; with reference to the fine gill-rakers.)

***Abudefduf melanopselion* sp. nov.** Fig. 23.

Head 3; depth  $2\frac{1}{8}$ ; D. XIII, 14, 1; A. II, 15, 1; P. II, 13; V. I, 5; tubes in upper arch of lateral line 16, followed by 3 pores as one on each scale sloping down behind, then 5 pores in straight section on side of caudal peduncle; 5 scales in vertical series between l.l. and

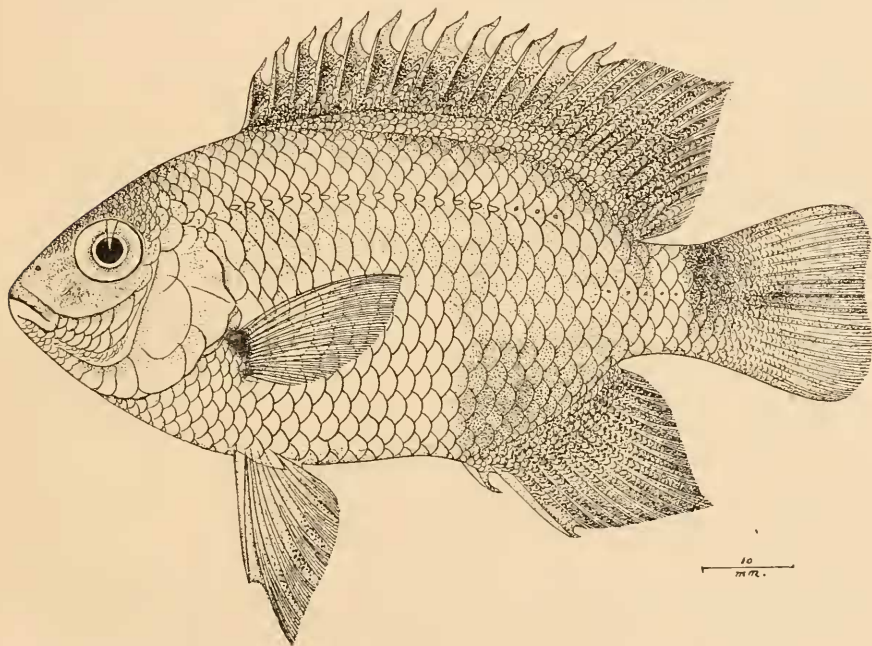


Fig. 23.—*Abudefduf melanopselion* sp. nov.

spinous dorsal origin, and 10 below in vertical series to spinous anal origin; 21 predorsal scales; head width  $1\frac{1}{2}$  its length; head depth 1; snout  $2\frac{1}{5}$ ; eye  $3\frac{2}{5}$ ; maxillary  $3\frac{2}{3}$ ; interorbital  $2\frac{3}{4}$ ; last dorsal spine  $1\frac{2}{3}$ ; seventh dorsal ray  $1\frac{1}{3}$ ; least depth of caudal peduncle  $2\frac{1}{6}$ ; second anal spine 2; seventh anal ray  $1\frac{2}{7}$ ; caudal  $1\frac{1}{4}$ ; pectoral  $1\frac{1}{5}$ ; ventral  $1\frac{1}{6}$ .

Body well compressed, rather deep, and greatest depth median, edges rounded or predorsal scarcely trenchant. Caudal peduncle compressed, least depth twice its length.

Head moderately large, well compressed, evenly constricted above and below, upper profile little more inclined. Snout nearly straight



in profile, convex over surface, length about  $\frac{4}{5}$  its width. Eye large, round, close to upper profile and hind pupil edge midway in head length. Mouth slightly inclined, jaws about even, gape short. Maxillary reaches about first  $\frac{2}{3}$  in space between nostril and eye, entirely slips below broad preorbital. Teeth as row of rather even crowded compressed incisors, as single cutting-edge, and each tooth with end rather broad, or truncate, though slightly emarginate medially. No teeth on roof of mouth or tongue. Inner buccal folds broad. Tongue free, pointed and depressed. Lips moderately broad. Nostril simple pore slightly before middle in snout length. Interorbital convex. Preorbital width  $1\frac{1}{4}$  in eye. Hind preopercle edge slopes well forward or about opposite eye center, and both it and preopercle ridge, also preorbital edge, entire.

Gill-opening forward about opposite hind maxillary end. Rakers 31+45, lanceolate or very slender,  $1\frac{1}{2}$  in eye. Gill-filaments 2 in eye, pseudobranchiæ equally long. Isthmus narrowly constricted forward with narrow branchiostegal membrane.

Scales ctenoid, narrowly imbricated, in even lengthwise rows, smaller along body edges. Fins all scaly basally. Suprascapula thin, entire. Cheek with 2 rows of scales. Scales on opercles moderate and small on top of head. Lips, preorbital, suborbitals and front edge of snout naked, also front of mandible. Scaly flap between ventral bases barely half of spine, and pointed axillary ventral scale about  $\frac{2}{3}$  of spine. Height of large humeral scale equals eye-diameter. Lateral line with upper branch curving up at first and then follows concurrently along back with upper limits of general squamation to end below front of soft dorsal. Tubes simple, large, over first half of each scale exposure. Pores in horizontal section small and inconspicuous, and one in middle of each scale exposure, not on caudal base.

Spinous dorsal inserted opposite pectoral origin, spines rapidly graduated up to third or fourth, then slightly so to last, fin edge well notched, and cutaneous flap from each spine tip behind. Soft dorsal origin little before last third in space between pectoral origin and caudal base, rays graduated to seventh, which longest and forms pointed tip behind reaching back half-way in caudal. Spinous anal origin midway between that of pectoral and caudal base, first spine  $\frac{2}{3}$  length of second. Soft anal graduated to seventh ray, fin pointed behind like soft dorsal. Caudal (damaged) apparently truncate behind, broad. Pectoral moderate,  $1\frac{1}{3}$  to anal, upper rays longest. Ventral inserted about opposite middle of pectoral base, spine  $\frac{3}{5}$



length of fin and latter not quite to anal origin. Vent about midway between ventral spine tip and spinous anal origin.

Color in alcohol pale russet-brown on front, shading off on front of back to chocolate-brown above medianly and posteriorly, which latter tint uniformly over dorsals. Region above anal, caudal fin, and anal fin chocolate-brown, fins of darker tint. Pale transverse streak on caudal peduncle and caudal base with broad dark transverse area. Median caudal rays dusky, outer pale. Dusky-brown blotch on upper half of pectoral base and slightly on humeral scale also. Lower surface of head, breast and belly all pale or light brownish. Lips grayish. Iris pale slaty. Pectoral grayish, paler below. Ventral blackish-brown, front and hind margins broadly pale.

Length 93 mm.

Type, No. 47,538, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

(*Μέλας*, black; *ψέλλιον*, bracelet; with reference to the black pectoral bases.)

***Chromis scotochilopterus* sp. nov.** Fig. 24.

Head  $3\frac{1}{4}$ ; depth 2; D. XIII, 11; A. II, 11; P. II, 16; V. I, 5; tubes in upper arch of lateral line 19, and 9 in straight section to caudal base; 3 scales above l.l. to spinous dorsal origin, and 9 scales in vertical row below to spinous anal origin; predorsal scales about 32; head width  $1\frac{2}{5}$  in its length; head depth 1; mandible  $2\frac{2}{3}$ ; fourth dorsal spine 2; fourth dorsal ray  $1\frac{1}{3}$ ; second anal spine  $1\frac{1}{2}$ ; sixth anal ray  $1\frac{3}{5}$ ; least depth of caudal peduncle 2; ventral  $1\frac{1}{10}$ ; snout 4 in head measured from upper jaw tip; eye 3; maxillary  $2\frac{2}{5}$ ; interorbital 3.

Body well compressed, contour deeply ellipsoid, greatest depth midway in its length, edges convex. Caudal peduncle well compressed, length  $\frac{3}{4}$  its least depth.

Head large, deep, compressed, flattened sides slightly constricted below, and upper profile slightly steeper. Snout slightly convex in profile, length half its width. Eye large, rounded, scarcely elevated, hind edge but slightly behind center in head length. Mouth oblique, gape moderate, lower jaw slightly protruded. Maxillary reaches slightly beyond front eye edge, not quite to pupil. Lips rather narrow, fleshy. Teeth short, strong, conic, in outer row in each jaw, and those in front little larger than others. Inner teeth fine, minute, crowded close behind outer row. No teeth on roof of mouth or on tongue. Inner buccal folds broad. Rami of mandible but little elevated inside mouth. Nostril about last  $\frac{2}{5}$  in snout length,

simple, moderate pore. Interorbital convex. Preorbital partly ensheaths upper maxillary edge, width 3 in eye. Hind preopercle edge slightly emarginate, whole edge entire.

Gill-opening extends forward opposite hind maxillary edge. Rakers 10+13, lanceolate, about  $\frac{4}{5}$  of filaments, and latter  $1\frac{3}{4}$  in eye. Pseudobranchiæ long as gill-filaments. Isthmus narrowly constricted forwards, with rather narrow branchiostegal membrane across.

Scales finely ctenoid, narrowly imbricated, in even lengthwise rows more or less converging behind, and smaller along body edges.

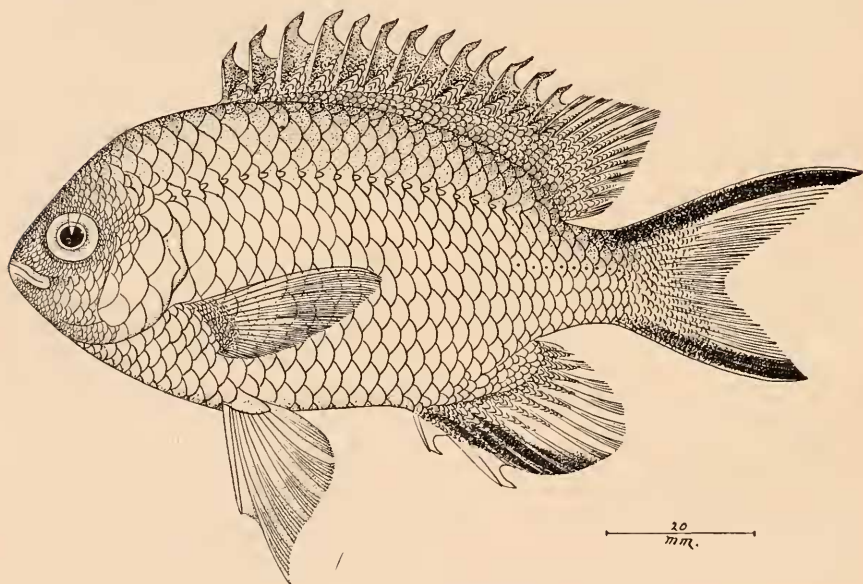


Fig. 24.—*Chromis scotochilopterus* sp. nov.

Fins all scaly basally. Suprascapula small, thin, entire. Head scaly, except lips, and on muzzle, suborbitals and interorbitals smaller scales crowded closely. Cheek with 6 rows of scales, two median rows enlarged. Opercles with moderately large scales. Humeral scale moderate. Ventrals with median scaly flap  $\frac{2}{3}$  of fin, and pointed axillary scale  $\frac{1}{4}$ . Upper branch of lateral line curving up at first, then concurrent with upper limit of general squamation on dorsal fins, and ends below front basal region of soft dorsal. Tubes simple, large, and well over front half of each scale exposure. Pores in horizontal section simple, small, one in middle of each scale exposure, and 2 irregularly on caudal base.

Spinous dorsal inserted about over ventral origin, spines graduated up to fourth after which subequal, fin edge notched and cutaneous flap from behind tip of each spine. Soft dorsal inserted nearly at last fourth in space between pectoral origin and caudal base, rays graduated up to fifth which forms point extending back well beyond caudal base. Spinous anal inserted midway between pectoral origin and caudal base, first spine 3 in second. Soft anal more rounded than soft dorsal, first 6 rays subequal. Caudal deeply forked, about  $2\frac{1}{3}$  in combined head and trunk, lobes sharply pointed and upper much longer. Pectoral reaches vent, which close before anal. Ventral reaches slightly beyond vent to anal, and insertion close behind pectoral base. Ventral spine  $\frac{2}{3}$  of fin.

Color in alcohol largely dull uniform brownish, scarcely paler below. Some small obscure whitish spots sprinkled on opercles and upper side of head, along middle of side and near depressed pectoral tip. Head brownish above, especially interorbital and upper snout surface. Iris slaty. Spinous dorsal blackish-brown. Soft dorsal blackish-brown basally, which broadly so at first and narrowly behind, rest of fin white. Dark color of this fin also reflected on adjacent region of back. Caudal white, except upper and lower borders broadly, to tips of lobes, which blackish-brown. Anals white, except along front edge of soft anal broad blackish-brown band to hindmost tip of fin. Pectoral pale, with small brownish axillary blotch above, though not extending on outside of fin. Ventral brownish, darker terminally. Apparently whole general coloration more or less olivaceous when fresh.

Length 115 mm.

Type, No. 47,539, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also No. 47,540, paratype, same data: Head  $3\frac{1}{8}$ ; depth 2; D. XIII, 11; A. II, 11; tubes in upper arch of l.l. 18, and 7 in straight section to caudal base; snout 4 in head measured from upper jaw tip; eye  $2\frac{2}{3}$ ; maxillary  $2\frac{1}{3}$ ; interorbital  $3\frac{1}{5}$ ; length 75 mm.

Allied with *Chromis xanthochir* (Bleeker), but differs in its coloration as represented in his colored figure.<sup>40</sup>

(Σκοταῖος, dark; χεῖλος, edge; πτερον, fin.)

*Chromis philippinus* sp. nov. Fig. 25.

Head  $3\frac{2}{3}$ ; depth  $1\frac{7}{8}$ ; D. XII, 11; A. II, 11; P. II, 15; V. I, 5; tubes in upper arch of lateral line about 15, and 9 pores in straight portion

<sup>40</sup> Atlas Ich. Ind. Néerl., IX, 1877, Pl. 3, fig. 5.

to caudal base; 3 scales above l.l. to spinous dorsal origin, and 9 below in vertical series to spinous anal origin; about 23 predorsal scales; head width  $1\frac{3}{4}$  in its length; mandible  $2\frac{7}{8}$ ; third dorsal spine  $2\frac{3}{8}$ ; twelfth dorsal spine 3; fourth dorsal ray  $1\frac{1}{4}$ ; second anal spine  $2\frac{1}{8}$ ; sixth anal ray  $1\frac{1}{2}$ ; least depth of caudal peduncle 2; pectoral 1; ventral 1; snout  $3\frac{1}{2}$  in head measured from upper jaw tip; eye  $2\frac{1}{2}$ ; maxillary 3; interorbital  $2\frac{3}{5}$ .

Body well compressed, contour somewhat ovoid with greatest depth near spinous dorsal front, and edges all convex. Caudal peduncle compressed, about long as deep.

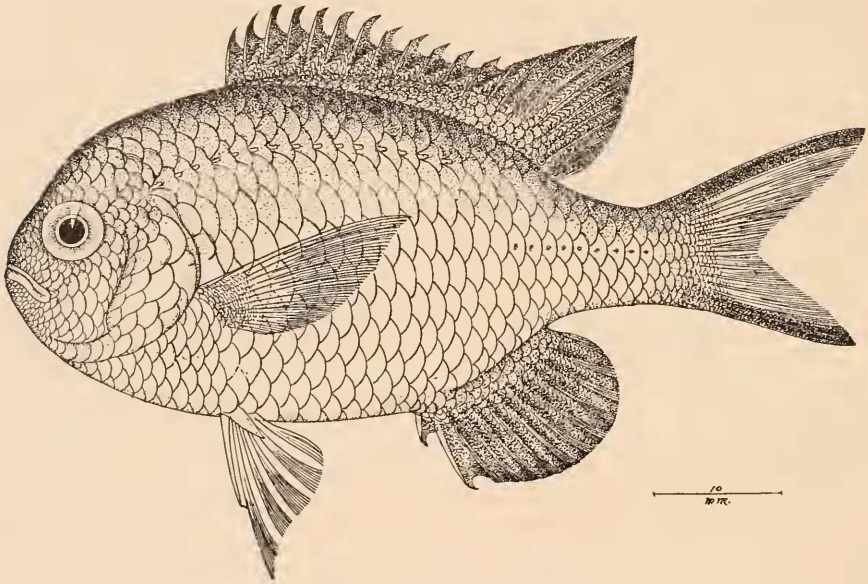


Fig. 25.—*Chromis philippinus* sp. nov.

Head rather large, well compressed, flattened sides slightly constricted below, profiles similarly and nearly evenly convex. Snout convex in profile and over surface, length  $\frac{3}{5}$  its width. Eye circular, large, but slightly elevated and hind pupil edge about midway in head length. Mouth small, oblique, gape short, and closed lower jaw slightly protrudes. Maxillary small, extends back very slightly beyond front eye edge. Lips fleshy, rather narrow. Teeth fine, simple, conic, strong, in bands in jaws, and entire outer row enlarged, especially anteriorly. No teeth on mouth roof or on tongue. Inner buccal folds broad. Tongue broad, depressed and free. Nostril simple pore at last  $\frac{2}{5}$  in snout. Interorbital convex. Preorbital



ensheaths upper maxillary edge, its width  $2\frac{1}{8}$  in eye. Hind preopercle edge obliquely forward opposite hind pupil edge, little emarginate below, and entire.

Gill-opening forward opposite front eye edge. Rakers 9+20, lanceolate, very slender, slightly less than filaments or latter about 2 in eye. Pseudobranchiæ about as long as gill-filaments. Isthmus narrowly constricted, especially anteriorly, with rather narrow branchiostegal membrane across.

Scales finely ctenoid, narrowly imbricated in even lengthwise rows somewhat converging behind, and smaller along body edges. Fins all scaly basally. Suprascapula small, entire. Head scaly, except lips, and on snout and mandible scales quite small. Cheek with 4 rows of scales, and a single row of broad ones on preorbital. Scales on opercle moderate. Humeral scale large as eye. Small scales on breast and pointed scaly flap between ventral bases 3 in fin, and pointed axillary scaly flap about same. Upper branch of lateral line curves up at first, then concurrent with upper limit of general squamation on dorsal fins, and ending below soft dorsal origin. Tubes simple, large, and extend well over each scale or for about first  $\frac{2}{3}$  its exposure. Pores in horizontal section mostly simple and single, though some few double, all median on each scale exposure, and not on caudal base.

Spinous dorsal inserted about opposite hind basal pectoral edge, spines slightly graduated to third, others more or less subequal, and fin edge notched. Soft dorsal inserted about last third in space between hind preopercle edge and caudal base, graduated to fourth and fifth rays, which form point behind extending slightly beyond caudal base. Spinous anal inserted nearer pectoral origin than caudal base, first spine nearly  $\frac{2}{3}$  length of second. Soft anal little more oblong than soft dorsal, little shorter behind. Caudal deeply forked, subequal lobes sharply pointed,  $2\frac{2}{3}$  in combined head and trunk. Pectoral reaches second anal spine base. Ventral inserted below last half of pectoral base, reaches nearly to anal, and spine about  $\frac{4}{7}$  of fin. Vent about midway between depressed ventral spine tip and anal origin.

Color in alcohol dark brown above generally, and lower surface paler. Traces of obscure mottling or spots on head above and back especially anteriorly. Under surface of head, with lips pale. Iris slaty. Dorsals blackish-brown, also anals. Caudal with lengthwise blackish-brown band broadly on upper lobe above and lower lobe



below, rest of fin paler or gray-brown. Pectoral and ventral pale brown.

Length 70 mm.

Type, No. 47,541, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Also Nos. 47,542 to 47,547, paratypes, same data. These show: Head 3 to  $3\frac{1}{4}$ ; depth  $1\frac{1}{5}$  to 2; D. XII, 11, once XII, 10; A. II, 11, rarely II, 10 to II, 12; tubes in upper arch of l.l. 15, rarely 14; pores in straight portion of l.l. 10, rarely 9 or 12; snout  $3\frac{1}{2}$  to 4 in head measured from upper jaw tip; eye  $2\frac{2}{5}$  to  $2\frac{7}{8}$ ; maxillary  $2\frac{4}{5}$  to  $3\frac{1}{8}$ ; interorbital  $2\frac{2}{3}$  to  $2\frac{7}{8}$ ; length 58 to 75 mm. Some of the smaller ones show a slight depression concavely above eye in upper profile.

Allied with *Chromis ternatensis* (Bleeker), especially in its pale anal and dark edged caudal, though differs in its preorbital not half so wide as in Bleeker's figure.<sup>41</sup> Day's figure of *Heliastes lepidurus*<sup>42</sup> is close in proportions, and is likely identical with the present species. His figure differs in a radiation of scales below the eye and the dark pectoral spot appears above the pectoral base and not on the base of first ray.

HOPLOCHROMIS subgen. nov.

Type *Heliastes cæruleus* Cuvier.

Differs from the subgenus *Chromis*, as represented by the preceding species, in the presence of external outwardly directed conic teeth in each jaw.

("Ὀπλὸς, armour; *Chromis*; with reference to the external series of teeth.)

*Chromis cæruleus* (Cuvier).

Six examples.

*Callyodon philippinus* sp. nov. Fig. 26.

Head 3; depth  $2\frac{2}{5}$ ; D. IX, 10, 1; A. III, 9, 1; P. II, 12; V. I, 5; scales in lateral line 19+5 to caudal base and 2 more on latter; 2 scales between spinous dorsal origin and l.l. and 6 below in vertical series to spinous anal origin; 6 predorsal scales; head width 2 in its length; head depth  $1\frac{1}{6}$ ; snout  $2\frac{1}{4}$ ; eye  $6\frac{2}{3}$ ; maxillary 5; interorbital  $2\frac{2}{3}$ ; third dorsal spine 3; first dorsal ray  $2\frac{2}{3}$ ; third anal spine  $3\frac{1}{5}$ ; third anal ray  $2\frac{4}{5}$ ; least depth of caudal peduncle  $2\frac{1}{4}$ ; caudal  $1\frac{2}{5}$ ; pectoral  $1\frac{1}{3}$ ; ventral  $1\frac{3}{4}$ .

<sup>41</sup> Atlas Ich. Ind. Néerl., IX, 1877, Pl. 4, fig. 4.

<sup>42</sup> Fishes of India, III, 1877, Pl. 82, fig. 1.

Body compressed, contour elongately ellipsoid, deepest about midway in its length, and edges convexly rounded. Caudal peduncle well compressed, length about  $\frac{3}{4}$  its least depth.

Head large, compressed, flattened sides about evenly constricted above and below, and upper profile a little more evenly convex than lower. Snout convex in profile and over surface, long as wide. Eye small, a little elevated, rounded, and its center nearly midway in head length. Mouth small, gape inclined forward, jaws even. Lips thin, broad, not covering teeth. Teeth welded into sharp-edged even cutting-edge. Two large upper posterior canines and larger lower one on each side. Inner buccal membranes broad. Tongue

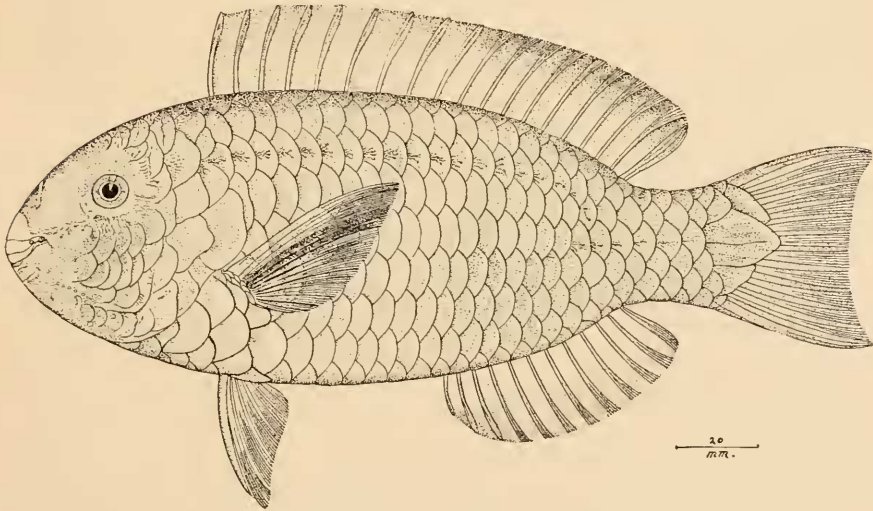


Fig. 26.—*Callyodon philippinus* sp. nov.

thick, depressed, apparently not free. Maxillary not half way in snout, not nearly to front nostril. Nostrils small, lateral, inconspicuous, little separated, hind one about  $\frac{2}{3}$  an eye-diameter before eye and both near level of upper eye edge. Interorbital broadly convex. Opercular flap narrow.

Gill-opening extends forward close behind hind nostril. Rakers 32 very short weak flexible points on outer edge of first arch, and about 52 slender setæ-like rakers on inner edge, which latter about  $3\frac{1}{2}$  in gill-filaments. Gill-filaments 2 in snout length. Pseudo-branchiæ about  $\frac{1}{3}$  of gill-filaments. Isthmus narrowly constricted, gill-membranes adnate.

Scales large, cycloid, and those on middle of sides with exposed

width a little less than half of exposed depths. Snout, interorbital, preorbital, muzzle and lower limb of preopercle anteriorly, naked. Cheek with 2 rows of broad scales. Several large scales on opercle. Fins, except base of caudal which covered with large scales, naked. Smaller scales along bases of dorsals and anals. Round scale between ventral bases about  $\frac{1}{3}$  of fin, and pointed axillary scale about  $2\frac{1}{2}$ . Lateral line concurrent with back, slopes down below bases of last dorsal rays and midway along side of caudal peduncle on caudal base. Tubes in first section of lateral line with several branches, all small, main stem most conspicuous and branches small.

Origin of spinous dorsal about over that of pectoral, spines more or less equal, rather flexible adipose ends present, and edge of fin entire. Soft dorsal origin little nearer upper corner of gill-opening than caudal base, membranes very shallowly emarginate along fin edge, and rays subequally high. Anal spines graduated to third, which longest, each ending in flexible adipose-like end. Soft anal like soft dorsal. Closed caudal slightly concave behind, when expanded nearly truncate and corners always sharp-pointed. Pectoral broad, upper rays longest, and fin  $\frac{4}{5}$  to anal. Ventral inserted about opposite pectoral origin, fin about  $\frac{3}{5}$  to anal, and spine ends in flexible adipose-like tip  $\frac{4}{5}$  of fin length. Vent close before anal.

Color in alcohol faded pale brownish with traces of olivaceous. Dorsals marginally with broad pale band length of both fins. Anal with similar submarginal band lengthwise. Caudal uniform brownish. Pectoral pale olive, but second, third and upper portions of fourth branched rays with their intervening rays dark brown, forming a lengthwise dark band. Ventral pale uniform brownish. Upper lip broadly pale, and with narrow line from mouth corner back to eye. Also short pale line from behind eye over postorbital, besides several smaller ones below, at lower edges. Small broken bars and spots of pale brownish on under surface of head. Iris slaty.

Length 215 mm.

Type, No. 47,548, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

This species somewhat resembles *Callyodon rivulatus* (Valenciennes) as figured by Bleeker,<sup>43</sup> but differs in the coloration, as there are no traces of the green median spots on the soft dorsal, the dark pectoral band is lower on the fin, and it does not show the spots and bars of pale color on the under surface of the head.

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<sup>43</sup> Atlas Ich. Ind. Néerl., I, 1862, p. 44, Pl. 9, fig. 3.

**Siganus fuscescens** (Houttuyn).

Large series, mostly young. These identical with material from Bacon, P. I., upon comparison. All have a dark shoulder-blotch and dark spots or blotches on trunk.

**Siganus corallinus** (Valenciennes).

One which differs slightly from a Sumatran example in the smaller dark spots on the head, doubtless due to age. Both agree largely with Müller and Schlegel's account. The alleged closely related *Chatodon guttatus* Bloch shows no dark spots on the head. Surely the figure by Quoy and Gaimard of their *Amphacanthus argenteus* cannot refer to this genus as it is shown with five dorsal spines and three anal spines. Its trunk is clouded olive and brown, and there is a white bar on the caudal peduncle.

**DROMBUS** Jordan and Seale.

## ULCIGOBIUS subgen. nov.

Type *Drombus maculipinnis* sp. nov.

Differs from subgenus *Drombus* in the higher spinous dorsal, larger scales and very conspicuous pores on the sides of the head. Ventrals joined, at least for their basal halves.

Probably *D. tutuilæ* Jordan and Seale belongs in the present group.

(*Ulcis*, boil, with reference to the pores on the side of the head; *Gobius*.)

**Drombus maculipinnis** sp. nov. Fig. 27.

Head 3; depth  $3\frac{3}{5}$ ; D. VI-10; A. I, 7; P. I, 14; V. I, 5; scales 23 in median lateral series from shoulder to caudal base and 3 more on latter; about 7 scales between second dorsal origin and anal origin; about 6? predorsal scales; head width  $1\frac{2}{5}$  in its length; head depth at occiput  $1\frac{2}{5}$ ; mandible  $3\frac{1}{6}$ ; first dorsal spine slightly less than head; eighth dorsal ray  $1\frac{2}{3}$ ; last anal ray  $1\frac{2}{3}$ ; least depth of caudal peduncle  $2\frac{1}{10}$ ; pectoral 1; ventral  $1\frac{2}{3}$ ; snout  $3\frac{2}{3}$  in head measured from upper jaw tip; eye  $4\frac{1}{2}$ ; maxillary  $3\frac{1}{2}$ ; interorbital about 2 in eye.

Body moderately long, compressed though little robust anteriorly and deepest about second dorsal origin. Body edges all rounded convexly. Caudal peduncle compressed, slightly longer than deep.

Head large, elongate, profiles similar, cheeks and lower sides greatly and evenly swollen backward, with upper head surface more constricted than lower. Snout convex over profile and surface, length  $\frac{2}{3}$  its width. Eye moderate, superior, advanced, largely directed upward. Mouth small, broad, gape extends about first  $\frac{2}{3}$  in snout. Mandible broad, protrudes, rather shallow. Lips thick,

fleshy, firm. Teeth in rather broad villiform bands in jaws, none on vomer, palatines or tongue. Inner buccal folds both rather broad. Tongue large, thick, oblong, adnate, and front end rather broadly truncate. Nostril small pore in depression at base of snout close before eye, but not visible in superior view. Interorbital deep narrow groove between elevated supraorbital ridges.

Gill-opening entirely lateral, long as space between mandible tip and front eye edge. Rakers 2+6, III, lanceolate, slightly less than filaments, and latter about half of eye. Isthmus broad, width equals snout and half of eye.

Scales large, ctenoid, moderately exposed, in even lengthwise

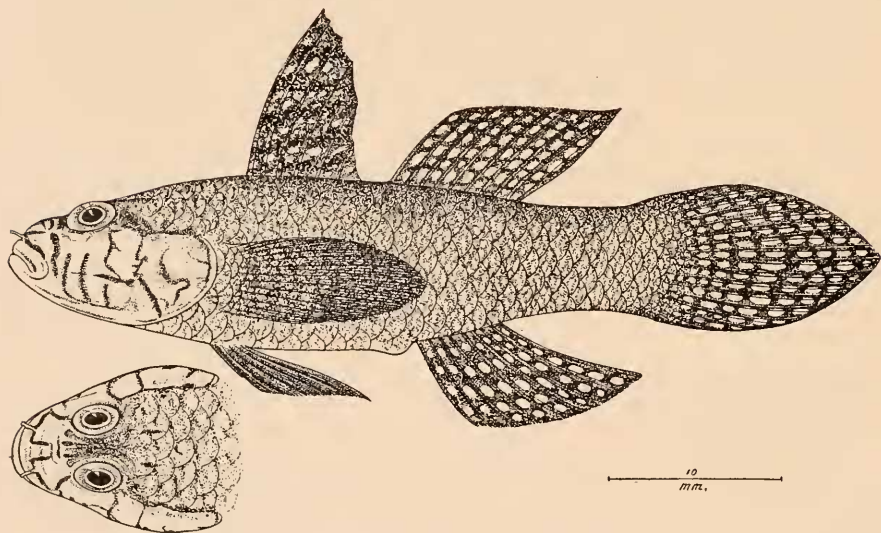


Fig. 27.—*Drombus maculipinnis* sp. nov.

rows. Caudal base scaly. Head scaly, with numerous transverse cutaneous narrow areas on cheek, side of head and snout. Cutaneous flap each side of snout tip nearly equal to pupil in length. Fins other than caudal apparently scaleless and without scaly flaps. No l.l.

Spinous dorsal inserted little nearer mandible tip than last dorsal ray base, first spines elongate, flexible and reach about  $\frac{2}{5}$  in second dorsal base. Origin of soft dorsal much nearer caudal base than hind eye edge, median and posterior rays little longer, and last ones reach caudal base. Anal origin close behind dorsal origin, fin similar to soft dorsal only smaller. Caudal elongate and ends in median



point behind. Pectoral large, with broad base, and reaches little beyond anal origin. Ventral inserted below gill-opening close before pectoral base, fins united for their basal halves, and reach large vent close before anal. Ventral spine small, about  $\frac{2}{7}$  length of fin.

Color in alcohol dark chocolate-brown, with basal pockets of scales dusky to blackish, and together with paler spots producing a mottled appearance. Fins all blackish or dusky-brown, barred or spotted with whitish. Cutaneous areas on head dark. Iris slaty.

Length 50 mm.

Type, No. 47,549, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

*Drombus palackyi* Jordan and Seale<sup>44</sup> has smaller scales, about 31 in a lateral series, body more slender or with the depth 6 and fins not marked with white.

(*Macula*, spot; *pinna*, fin.)

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<sup>44</sup> Proc. U. S. Nat. Mus., XXVIII, 1905, p. 797, fig. 15.